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TORONTO

~~ed/304~~

Ed/212

OUTLINES
OF
PSYCHOLOGY

BY

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First Edition, February 1891.
Reprinted, November 1891, 1893, 1896, 1901, 1904, 1908, 1912

TRANSLATOR'S NOTE.

THIS translation is not from the original Danish, but from the German. The German edition is however accepted by Dr. Höffding as adequately representing the original, and I hope therefore the present version has not suffered by being at secondhand. I am glad to have this opportunity of thanking Dr. Höffding for his cordial interest in the preparation of the English edition and for his kindness in sending corrections and notes where later discoveries made it necessary; and also of thanking Dr. Ward and Prof. Croom Robertson for their very kind help with difficult passages and expressions, and Mr. James Sime for preparing the index and for his careful revision of the translation as it passed through the press.

MARY E. LOWNDES.

CONTENTS

PAGE

I. SUBJECT AND METHOD OF PSYCHOLOGY 1

1. Provisional description of psychology as the science of mind.—2. External perception precedes internal.—3. Evidence of language.—4. Psychological development of the distinction between self and not-self.—5. The mythological conception of the mind.—6. Direct and indirect apprehension of mental life.—7. Psychology and metaphysics.—8. Method of psychology. *a.* The difficulty of introspection. *b.* Influence of individual differences. *c.* Psychological analysis. *d.* Experimental psychology. *e.* Subjective and objective psychology. *f.* The mutual relation of the different methods. —9. The relation of psychology to logic and ethics.

II. MIND AND BODY 29

1. The empirical (phenomenological) standpoint.—2. The law of the persistence of energy.—3. Organic life and the persistence of energy.—4. *a.* The importance of the nervous system. *b.* Reflex movement. *c.* Subordinate nerve-centres. *d.* The cerebrum. *e.* The cerebrum and the lower centres. —5. Provisional account of consciousness.—6. Parallel features in consciousness and the nervous system.—7. Proportionality between conscious life and cerebral activity.— 8. *a.* Dualistic-spiritualistic hypothesis. *b.* Monistic-materialistic hypothesis. *c.* Monistic-spiritualistic hypothesis. *d.* The hypothesis of identity (monism).

III. THE CONSCIOUS AND THE UNCONSCIOUS 71

1. Definition of the unconscious.—2. Conscious thought resulting from previous unconscious work.—3. Conscious

PAGE

sensuous perception resulting from previous unconscious work.—4. Unconscious connecting links.—5. Instinct and habit.—6. Unconscious and conscious activity simultaneous. —7. Unconscious growth of feeling.—8. The dream state.— 9. Awakening through the psychical relation of the impression.—10. Hypothesis as to the extension of mental life.— 11. Psychology and physical mechanics.—12. Laws common to mind and matter.

IV. CLASSIFICATION OF THE PSYCHOLOGICAL ELEMENTS 87

1. Classification of elements, not states.—2. The psychological tripartite division.—3. The tripartite division not original.—4. Evolution of the individual consciousness.— 5. Psychological differentiation during the evolution of the race.—6. Conditions of differentiation.—7. *a.* No cognition without feeling. *b.* No cognition without will. *c.* No feeling without cognition. *d.* Connection between feeling and will. *e.* The will as first and last.

V. THE PSYCHOLOGY OF COGNITION 101

A. Sensation 101

1. The psychological significance of the question as to the simplicity and self-dependence of sensations.—2. The simplicity of sensations.—3. The self-dependence of sensations.—4. On the quality of sensations.—5. The law of relativity in the province of sensation.—6. Motor-sensations. —7. Sensation and movement.

B. Ideation 121

1. Sensation and perception.—2. Free representations.— 3. Sensation, perception, and free representation.—4. Separation of free representations or ideas from percepts.—5. Formal and real unity of consciousness.—6. Preservation of ideas.— 7. *a.* Memory-images, hallucinations, and illusions. *b.* Remembrance conditioned by the circumstances of the actual experience. *c.* Remembrance, conditioned by the circumstances of reproduction. *d.* Remembrance, conditioned by the character of the ideas.—8. *a.* Regularity of the combination of ideas. *b.* The laws of combination of ideas. *c.* Fundamental law of combination of ideas. *d.* The laws of obliviscence.—9. Simple ideas, individual ideas, and general

PAGE

ideas.—10. Language and ideas.—11. Association of ideas and thought.—12. Formation of free concrete individual ideas (imagination).

C. The Apprehension of Time and Space 184

1. Conditions of the idea of time.—2. Development of the idea of time.—3. Symbolic character of the idea of time.—4. Estimation of time.—5. Is the form of space original?—6. Is the perception of distance original?—7. *a.* Is the perception of surface original? *b.* Simultaneous impressions. *c.* Local signs.—8. "Nativistic" and genetic theory.—9. Organic basis of the intuition of space.—10. The idea of space.

D. The Apprehension of Things as Real 205

1. The content of cognition as expression of a reality.—2. Connection as criterion of reality.—3. The causal relation.—4. Psychological development of the causal concept.—5. The limits of cognition.

VI. THE PSYCHOLOGY OF FEELING 221

A. Feeling and Sensation 221

1. Unity of the life of feeling.—2. Feeling different from special sensation.—3. Feeling and the several senses. *a.* Vital feeling. *b.* Feelings accompanying contact and movement. *c.* Feelings accompanying taste. *d.* Feelings accompanying smell. *e.* Feelings accompanying sight and hearing.—4. The natural course of development of the elementary feelings.

B. Feeling and Ideation 233

1. Originality of feeling.—2*a.* Disgust, sorrow, hate. *b.* Love, joy, sympathy. *c.* Impulse, desire. *d.* Hope, fear. *e.* Mixed feelings.—3. The law of the development of feeling.—4. Remembrance of feelings.

C. Egoistic and Sympathetic Feeling 242

1. Egoistic centre of gravity.—2. The psychological genesis of sympathy.—3. The physiological basis of sympathy.—4. The feeling of love and sympathy.—5. Sympathy takes root through inheritance and tradition.—6. Ideal satisfaction of sympathy.—7. Disinterested sympathy.—8. Ethical and religious feeling.—9. Intellectual and æsthetic feeling.

PAGE

D. The Physiology and the Biology of Feeling 267

1. The physiological seat of feeling.—2. The biological significance of feeling.—3. Feeling and the conditions of life.

E. The Validity of the Law of Relativity for the Feelings . . . 275

1. The law of relativity common to cognition and to feeling.—2. Contrast and rhythm of feeling.—3. Relative feelings.—4. Effect of repetition upon feeling.—5. Emotion and passion.—6. Pessimism and the law of relativity.—7. No neutral states.—8. The feeling of the sublime.—9. The feeling of the ridiculous. *a.* Laughter apart from anything ridiculous. *b.* Laughter as expression of the feeling of power and freedom. *c.* Sympathetic laughter (humour). *d.* The ridiculous rests on effect of contrast. *e.* The sublime and the ridiculous.

F. The Influence of Feeling on Cognition 298

1. Feeling as inhibitive, preserving, and selecting.—2. Incentive of feeling and association of ideas.—3. The teleology of feeling and the mechanism of cognition.—4. Expansion of feeling. *a.* The anticipating and realizing effect of feeling. *b.* The inciting and animating influence of feeling.

VII. THE PSYCHOLOGY OF THE WILL 308

A. The Originality of the Will 308

1. The will the most primitive and the most derivative mental expression.—2. Spontaneity and irritability.—3. Spontaneous and reflex movements in higher organisms.—4. The physiological seat of instinct and of will.—5. Involuntary and voluntary attention.—6. *a.* The will and the motor-ideas. *b.* Isolation and combination of movements. *c.* The significance of the inherited basis.

B. The Will and the other Elements of Consciousness 321

1. The higher development of the will, conditioned by the development of cognition and of feeling. *a.* The psychology of the impulse. *b.* The wish. *c.* Deliberation, purpose, and resolve.—2. Reaction of the will upon cognition and feeling. *a.* Reaction of the will upon cognition. *b.* Reaction of the will upon feeling. *c.* Reaction of the will upon itself.—3. Relation of opposition between the will and the other elements of consciousness (concentration and expansion).—

PAGE

4. Consciousness of will. *a.* The consciousness of volition. *b.* The problem of reality in the province of the will.—5. The will and the unconscious mental life. *a.* The centre of consciousness not always the centre of individuality. *b.* Determinism and indeterminism.

C. The Individual Character 348

1. Typical individual differences.—2. Physical, social, and inherited elements.—3. Psychical individuality an empirical limit to cognition.—4. Psychology and the evolution hypothesis.

~~AT/ 125~~ ~~Ed 304~~ Ed 212

OUTLINES OF PSYCHOLOGY

I

SUBJECT AND METHOD OF PSYCHOLOGY

1. PSYCHOLOGY is the science of mind—that is the shortest description we can give of the subject of the present inquiries. But it is merely a provisional description, yielding no clear and distinct conception. It serves merely to mark psychology as the science of that which thinks, feels, and wills, in contrast with physics as the science of that which moves in space and occupies space. These two provinces include everything that can be the subject of human research. Psychology is as little bound to begin with an explanation of what mind is, as physics is obliged to begin with an explanation of what matter is. And this general statement of the subject of psychology involves no assumption as to the question how far the mind exists, or does not exist, as an independent being distinct from matter. It will be our endeavour to preserve psychology as a pure science of experience, and to distinguish sharply between the given facts and the hypotheses employed to classify and explain them.

But even in starting from the position that mental phenomena have certain characteristics which distinguish them from material, we presuppose a knowledge which was reached only at a certain stage of mental development, and of which we cannot even yet say that it is universal. It will set the subject of psychology in a clearer light if we adduce certain features characteristic of the way in which the idea of the mental has been developed in the human race, and is still developed in each individual.

2. Mental, like bodily, vision is from the beginning directed outwards. The eye apprehends external objects, their colours and forms, and only by artificial, roundabout ways, sees itself and what is within itself. And even in respect of external objects, the eye is always naturally set for the vanishing point, the greatest distance of sight. While we are conscious of a certain effort when the eye has to accommodate itself to nearer objects, it is with a feeling of relief and ease that we direct the glance from nearer to more distant objects. In like manner external objects occupy our attention long before we think of the sensuous perception and conception through which alone external objects exist for us. Our immediate natural life we carry on in sensuous perception and in imagination, not in subjective reflection. This is connected with the fact that man acts before he theorizes. His weal and his woe are conditioned by his power of forgetting himself in the outer world. Observations of animal and human life, of the appearance of plants and fruits, of the course of the heavenly bodies, etc., are more important in the struggle for existence than observations of self. Only at a higher stage of culture can the command "know thyself" be pronounced, and with it the way be opened to direct psychological inquiry.

3. Because language was developed under the influence of attention directed to the external world, we find that expressions for mental phenomena were originally taken from the material world. The inner world of mind is denoted by symbols borrowed from the outer world of space. This observation had been made already by Locke and Leibniz, and the modern science of language has confirmed it. "All roots, *i.e.* all the material elements of language, are expressive of sensuous impressions, and of sensuous impressions only; and as all words, even the most abstract and sublime, are derived from roots, comparative philology fully endorses the conclusions arrived at by Locke."[1]

There are interesting examples in the words which denote spirit and mind in different languages, in the names for mental activities, and in the meaning of prepositions. "It may be fairly taken as established that all real prepositions originally denote relations of space exclusively, not only because all the several significations that can be traced lead to this conclusion, but also . . . because these spatial relations were the only relations which could be pointed out, and were so distinctly apprehended that there could be a common understanding about words applied to them. The task of language—that is to say, the need and the endeavour of speaking man—was therefore to make clear, by means of analogy with and reference to spatial relations, the non-spatial relation in which ideas appeared."[1]

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[1] Max Müller, *Lectures on the Science of Language* (2nd ed. 1885), ii., pp. 372, 373. Locke cites as examples: to imagine, apprehend, comprehend, spirit. Müller adds to these, among others: animus, from *anima*, air (*Athem*); *cf.* Sanscrit *an*, *blasen*, Greek *aënai*, and Sanscrit *anila*, Greek *anemos*, wind.

4. If, then, the first set of ideas into which man penetrates derives its elements from external nature, how is it that we ever come to distinguish between our own self and the things outside of us?

The beginning of conscious life is to be placed probably before birth. It is true that as yet the tender organism is divided off from the great outer world; some of the most important sensuous impressions (sight, hearing, and smell) are rendered possible only through birth; and those sensations which are possible (taste, and sensations of touch and movement) are no doubt only faintly and dimly distinguished from the general feeling of vegetative comfort and discomfort. Still the experiences undergone before birth perhaps suffice to form the foundation of the consciousness of an external world. The feeling of comfort or discomfort, together with the sensations of movement, may even at this stage offer a certain contrast to the sensations of resistance, contact, and taste. It follows as a matter of course that this first germ of a world-consciousness is dim and dreamlike, and that we, from our waking, fully conscious standpoint, are easily tempted to attribute too much to it. But these first stirrings must be taken into account, especially as they serve to indicate the difficulty of fixing on a definite point as the point of transition from unconscious to conscious existence. To Erasmus Darwin and Cabanis belongs the credit of having shown the significance of this first period of mental life.

The revolution effected by birth probably consists, not in a quickening, but in a great alteration of the relations of life, internal as well as external. Organic sensations (sensations of what passes within the organism) and the vital-feeling or general feeling of life (the pleasure or pain accompanying organic sensation) are changed by the fact that nourishment and breath no longer stream in immediately from the maternal organism, with which the fœtus shared a common life, but have to be taken in from without and appropriated by special organs (alimentary canal and lungs). In addition to the fact that internal functions thus acquire greater energy and independence, stronger pulsations of organic sensation are brought about by the same cause, for the previously continuous influx now becomes periodic and interrupted, so that the contrast between feelings of pleasure and pain becomes more intense. At the same time impressions from the greater outer world rush in upon the tender organism, which must be especially susceptible to impressions of cold. The cry of pain, with which the new-born infant begins life, finds its most probable explanation partly in the difficulty of breathing produced by the separation from the maternal organism, partly in sensations of cold.[1]

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[1] J. N. Madvig, *Sprogvidenskabelige Ströbemärkninger* ("Observations on the Science of Language"), Copenhagen, 1871 (*Universitätsprogramm*), p. 9. Leibniz has brought this out very prominently. *Nouveaux Essais*, iii. 1, 5 (Opera, ed. Erdmann, p. 298).

Although at first organic sensation continues to play the greatest part, yet such a variety of impressions gradually streams in upon the young consciousness that a more definite contrast between a subjective and an objective pole becomes possible. Just as feelings of pleasure and pain, organic sensation, and the sensation of movement appear in a more energetic form by reason of the greater contrast with the external world, so the influences received from that world are now more definite and stronger. The impressions of light and sound render possible a discrimination and an acquaintance with the surroundings, which far surpasses in delicacy that produced by mere sensations of touch and movement. The resistance offered by the hard-and-fast world to the movements of the child is much more powerful than that which its movements met with in the soft and fluid surroundings in the maternal organism. Finally, a set of memories and ideas is now formed, which is soon contrasted with sensations and percepts.

Light affects the new-born infant at an early stage, although in this as in other respects individual differences immediately assert themselves. The child seems to take pleasure in an excitation of light, and tries (even on the second day after birth) to turn towards it, in order to retain it. The power of fixing the gaze on definite objects is developed from the third week; the objects most readily retained are of course those which are near and catch the eye. Clear, brightly coloured, and moving objects especially attract the attention. Memory also now plays a leading part. Instead of crying so long as it feels hungry, the child is pacified at the sight of preparations for the satisfaction of its wants (in the third week), and recognizes its mother (from the third month) as the source of this satisfaction, a step assisted by sensations of sound, for the child turns its head to the side whence sound comes.[1] Sensations of light, sound, and touch appear, indeed, as phenomena independent of the individual's feelings of pleasure and pain, and of his active movement, but do not directly come into conflict with them. The sensation of resistance and limitation first does this. Such sensations of checked and hampered movement, as already noted, are possible even in the fœtus state, but they now become more varied and powerful. The strong vegetative energy finds expression in movements of the limbs, and the child is thus led to experiment with things of the outer world. Active experiment is for the adult also the surest means of making acquaintance with his surroundings. The child does not wait for the outer world to come to him ; from the beginning he himself grasps at the world by involuntary movements, and thus secures the best knowledge as to the limit between the world and himself. The not-self begins wherever movement meets with resistance, especially if the resistance causes pain. When memory-images become numerous and connected, a third important "moment" is reached, the contrast, namely, between the clearer and stronger impressions which arise immediately, unexpectedly, and often disconnectedly, and the weaker images which are at the disposal of consciousness under all circumstances,—the contrast, that is to say, between percepts and memories.

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[1] Adolf Kussmaul, *Untersuchungen über das Seelenleben des neugeborenen Menschen*, p. 27 *seq.*

Now the question is, how much is included in the self? The limits of the self coincide for a time with the limits of the organism. All that takes part in movement and meets with resistance we reckon as part of self. The limitation can be learned only by experience. The child gradually discovers his own body. The hands are the first familiar part of his own organism ; they are examined especially by means of the lips and the tongue, the child sometimes putting his finger in his mouth and sucking it even on the first day. Afterwards he learns to fix his gaze on the hands, and then a firm association of ideas is speedily formed between the muscular sensation accompanying their movement and the appearance which this movement presents. Later, again, the feet are discovered; this can be done only when the child can sit up and see them, or when, lying on his back, he can stretch out his legs so as to look at and catch hold of them. The great interest which a child takes in his limbs and movements may be due to the wonderful circumstance that here is something which can be seen and grasped, and offers resistance, and yet shares in active movement. It is an object, which nevertheless pertains to the subject. The experience of the child is here the same as that of the dog running after its own tail. The fact that a child, even towards the end of his second year, will offer his foot a biscuit, shows that he still looks upon it as an independent being. Reciprocal contact of the limbs, and resistance of one to movements of others, gradually give precision to the idea of his own body as something related to, yet in a peculiar way different from, other objects. This idea becomes most clear when the child gives himself pain by treating parts of his organism as purely objective.

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[1] Kussmaul, pp. 26, 39. Vierordt, *Die Physiologie des Kindesalters*, pp. 154, 159.

A further step is now possible; this, however, is taken only at a more advanced age, and not by everybody or in all times. The body, hitherto separated off from the not self, has nevertheless shown itself to possess essential characteristics in common with the not-self; it can be perceived by the senses, and can offer resistance. Thus it presents a contrast to the feelings of pleasure and pain, and to the inner stream of memories and ideas. *That through which* we feel pleasure and pain we may perhaps perceive by means of the senses, but not *the feeling itself*. *That which* we remember and represent to ourselves may be an object of outer perception, but not so the *remembrance* and the *idea* themselves. This contrast is so decisive that the idea of the body may be transferred to the objective pole, to the not-self, and then there remains to us only the idea of self as the subject of thought, feeling, and will. The contrast between the inner and the outer now becomes more acute, or rather, we retain the expression "inner" as a figurative designation of the mental province in contrast with the material as the "outer." Inner experience, then, relates to thoughts, ideas, and feelings, as mental conditions; outer experience, to what is capable of being seen, and can resist movement in space.

5. The psychology of primitive races teaches that the idea of the mental has passed through the same stages in the history of the human race as in the individual. The ordinary mythological theory

attributes to primitive man a tendency to conceive and explain all natural phenomena by everywhere introducing his own conscious life. "To explain" means simply to trace the unknown back to the known, and whence (so argues this theory) should man originally derive the elements for the explanation of natural phenomena, if not from himself? This much is certain, that the mythological conception of nature is distinguished from the scientific by its tendency to personify. But may not this tendency itself require explanation, and may it not be asked whether there are not necessary intermediate links through which the idea of personal powers is transferred to natural phenomena? The theory referred to seems to impute to primitive man a creative imagination which is possible only at a higher stage of development. And were the theory correct, it would necessarily be expected that language would denote material things by terms originally applied to mental things, whereas in reality it denotes mental things by terms originally material.

Modern investigations relating to the mental life of savage races have led, therefore, to a modification, if not to a complete rejection, of the theory of an originally personifying faculty. Tylor, Lubbock, and Spencer have proved that dream-images play an extraordinarily large part in moulding the primitive conception of the universe. In dreams a man sees himself and others, and having at first no reason for assuming a difference between dream-images and percepts, he believes the former to be as real as the percepts of waking life. Just as a child delivers greetings from people he has dreamt of, so the primitive man takes everything occurring in dreams for actual experience. He has therefore been in distant places, although it is evident his body has not moved from the spot; and others have visited him, although it is certain that they were far away or dead. Besides dream-images, reflections of himself and others confirm the notion of a form of existence other than that given with the presence of the body in a definite place. A savage who had been made to look into a mirror exclaimed, "I gaze into the world of spirits!" One of Darwin's children, at nine months old, turned to the looking-glass on hearing his name called. Such experiences lead to the notion of a double existence: as mind, man is a free, ethereal being; as body, he is tied down to definite and limited places in space. Now, this duality forms a firm point of support for the imagination. Striking phenomena—change, the emergence of things and their vanishing away, life and death—find now their natural explanation, a like duality being assumed to exist in everything. The spirits of the dead especially serve as an important element of explanation; with them dreams and imagination are chiefly occupied, and there is consequently a disposition to find their intervention everywhere. All nature is peopled from the world of dreams.

But it would certainly be going too far to suppose that we can dispense altogether with the assumption of a personifying tendency. It is one thing to find the mere appeal to such a tendency not enough; quite another to dispense with it entirely. A man must at any rate recognize his own person in dreams, and ascribe to the images of other men shown in dreams a life of feeling and will corresponding to his own. If we wholly reject the personifying tendency, it is impossible to explain how man can assume at all the existence of other personal beings besides himself. The dream-theory marks an advance so far, that it makes the fact that man attributes his own mental life to his "double" easily intelligible; in this case he immediately recognizes himself in other relations. But what takes place here differs only in degree from what always takes place when he recognizes a mental life in other beings, who execute movements such as he would himself make in certain moods. His instinct of self-preservation leads him, at an early stage, to attach a meaning to the movements of other beings—to interpret certain looks and attitudes as signs of certain feelings. Such interpretation takes place instinctively and involuntarily, and —to judge from the ease with which a little child learns to distinguish friendly from threatening countenances—is perhaps based upon an innate faculty. Logically formulated, it would be called an inference by analogy. To what lengths the analogy is carried depends on the standpoint. At the mythological standpoint, man is very ready to ascribe to things outside of himself a mental life like his own. The boundary between the self and the not-self also, is indefinite as with children. Only advancing experience can draw more precise lines of demarkation.

The mind is at this stage conceived as an ethereal being, in contrast to the body as a coarser and heavier being. This duality has to pass through many phases before it is developed into the contrast between an immaterial and a material being. The physical characteristics of the conception of mind are only slowly and by degrees worn off. In the mental development of the Greeks such a refining process occurred in the period between

Homer and Plato. For Homer, the mind is only a fainter copy, a reflection, of the body; a man's real self, according to his childlike mode of conception, is destroyed with the body, and he thus makes the *souls* of his heroes descend into the underworld while they *themselves* are a prey for dogs and birds! (*Iliad*, I. 3, 4.) Plato, on the contrary, makes Socrates, on Crito asking "how he would be buried," address his friends as follows: "I cannot persuade this Crito that I am the Socrates who is conversing with you and presiding over the argument. He thinks that I am the body which he will soon see a corpse, and he asks how he shall bury me." (*Phædo*, tr. by F. J. Church, p. 186.) Here is expressed a purely spiritual conception of the mind, its essence being represented as activity of thought. This pure conception—which the ancient philosophers did not work out—was again obscured in the Middle Ages, when faith bore a distinctly materialistic impress; *e.g.* it represented souls as burning in purgatory. In modern times, Descartes, who found the essence of the mind in consciousness, stands in the same relation to the conception of the Middle Ages as that in which Plato stood to Homer. Were we to explain, by the way of psychological analysis, this transition from the standpoint of Homer to that of Plato, we should come back to a process similar to that described above as taking place within the individual consciousness (p. 5 *seq.*).

6. That we directly know mental life only in ourselves, and discover it outside of us by way of analogy, we may finally convince ourselves by taking a physiological standpoint. While organic processes and movements were explained through a special vital force or through the unconscious activity of the mind, mental life could of course be extended to all organic phenomena. But even then there remained the question of the relation between the "soul" in the wider sense, as vital force, and the soul in the narrower sense, as consciousness. Descartes was the first to lay down with precision the purely psychological criterion of mental life, in opposition to the older Aristotelian conception, which applied the word "soul" even to the principle of nutrition. He preferred to avoid the word "soul" (*anima*) on account of its ambiguity, and substituted the word "consciousness" (*mens*) when he wished to denote the subject of psychology. The realm of souls was thus greatly narrowed. Descartes himself found only in man occasion for the assumption of a consciousness; animals he regarded as mere machines. This

was a paradox, but indicates a reform in the conception of nature. Instead of appealing to forces that work mysteriously, we can now, since "soul" has been severed from the material world, introduce a purely mechanical explanation of nature.

Modern physiology interprets the phenomena of organic life by means of physical and chemical laws. It is in this way that all the explanations which it has as yet succeeded in giving, have been reached. Physiology has for this reason been called organic physics.[1] While acknowledging the mysterious in the origin and development of life, it knows no way in which the problem can be solved except the reduction of organic phenomena to physical and chemical processes. An appeal to the "vital force," or to the intervention of the mind, it does not recognize as a scientific explanation of an organic phenomenon; it sees in that only a confession of our ignorance regarding the nature of the phenomenon.

Physiology does not of course deny the existence of mental life, in the sense of a conscious life. It inquires in each individual case whether the material movements which we see before us justify us in assuming that consciousness is associated with them. The answer depends partly on whether the movements are so purposive that we must suppose them carried out with deliberation, partly on whether they are such as we ourselves make on experiencing pleasure or pain. In both respects we often interpret too freely. Purposive movements may be executed quite unconsciously by means either of an innate mechanism or of a mechanism produced by practice. They are then mere "reflex movements"—that is to say, movements springing from the fact that an excitation brought to a central organ by an afferent nerve is immediately sent back by the central organ ("reflected") through an efferent nerve. Among such involuntary and unconscious movements must be placed those which a frog, after it has been deprived of its head, executes in order to get rid of a corrosive acid or of some restraint, although from the purposive character of these movements some have assumed the existence of a "spinal mind" in the headless animal. Even in so-called "instinctive actions" it is often difficult to determine the extent to which there is conscious deliberation. As regards the feeling of pleasure or pain, physiology, holding that a parallel may be shown between the degree of the development of consciousness and that of the nervous system, maintains with regard to animals of lower organization (*Radiata, Mollusca, Articulata*) "that by no kind of injury do they feel such pain or torture as man can feel, and such as deserves the pity of man"; that the pain which fish and reptiles are capable of feeling is extremely small, about as much "as that produced in men by the sting of a flea or a gnat"; further, that even the pain of birds may not be compared to that of man under similar injuries.[1] To conclude terrible sufferings from the convulsions and the death-rattle of the dying is often a mistake. When death comes slowly, the pain is over before the death-struggle begins, and the convulsions are often only reflex movements, which take place after the circulation of the blood is checked and the activity of the brain has ceased.[2] On the other hand, to an ignorant bystander death by poisoning from curare appears quite painless, for there no convulsion or death-rattle takes place. But this poison attacks first only the organs connecting the motor nerves and the muscles, and thus prevents any indication of feeling during the interval that elapses before the poison has arrested all the functions of life. Thus there may be the most frightful death-anguish without external token of it. Claude Bernard[3] makes use of this very example to emphasize the fact that we know with complete certainty the capacity for feeling (sensibility) only from our own consciousness, and that we are easily led astray when we try to determine whether such a capacity exists in other beings or not.

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[1] Panum, *Indledning til Physiologien* ("Introduction to Physiology"), Copenhagen, 1883, p. 7.

If we wish, then, to gain a knowledge of conscious life, we must study it, above all, where it is directly accessible to us—namely, in our own consciousness. This immediate experience is also the only source whence the physiologist can determine the significance for mental life of the various organs of the brain. It is the secure starting-point for all our knowledge of the mental world.

7. But now how much is contained in this starting-point? The subject-matter of psychology is not something that can be presented to the imagination or to sensuous perception. It is not something that we can directly find outside ourselves, but something which we transfer, consciously or unconsciously, whenever occasion offers, from ourselves to others. More than that which

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[1] Panum, *Indledning* ("Introduction"), p. 56.

[2] E. Hornemann, *Om Menneskets Pilstand kort för Döden* ("On the Condition of Man just before Death"), Copenhagen, 1874, p. 18.

[3] Claude Bernard, "Le Curare," *La Science expérimentale*, Paris, 1878.

inner observation of our own consciousness teaches us we are not therefore justified in using as a basis. Here, however, there is something the reality of which cannot be disputed. No one can deny that there are sensations and ideas, feelings and decisions; and in saying that psychology is the science of mind, we mean by mind, to begin with, nothing more than the sum of all these inner experiences. In this sense the existence of the mind is not open to doubt, but, on the contrary, is a necessary assumption. There is, however, another sense in which the question as to the position of science with regard to the existence of the mind may be raised. Not content with the simple starting-point of psychological experience, spiritualism has thought it necessary to base psychology on the idea of the mind as an independent, self-existent, individual being (a substance). This is an idea which points back historically to the mythological duality, as this was refined and moulded by considerations partly ethical, partly theoretical. On the one side, an influence was exerted by the sense of the high value of mental life—the feeling that everything that interests us dwells in this inner world of thoughts and feelings, and that the outer world of matter has value for us only as an object of thought and feeling. This inner world was therefore exalted far above the material world, and sharply distinguished from it. On the other side, the spiritualistic conception is grounded in an analysis of the characteristics of mental states. It is peculiar to consciousness, to bring together things dispersed in time and space. Differences of time are annulled in memory, differences of space in comparative and combining thought. There is here a thoroughgoing unity, an inner connection, without a parallel. Is not this sufficient justification for ascribing to the mind an existence in and for itself, and for conceiving it as an immaterial substance?

But however great the justification may be, we cannot at any rate acknowledge it at the beginning of psychology. Here it is above all things important to build upon nothing but immediate perception. And this supposition does not even help us to a better understanding of mental experiences. From the character of certain experiences the existence of a mental substance is deduced, but about this substance only so much is known as is contained in these experiences; so far as more knowledge is sought, the validity of the deduction ceases. Experience does, indeed, teach that the special characteristic of consciousness, in contrast with material phenomena, is the inner unity of the variety of all conscious-content, a unity which does not exist in the world of space; but it does not teach that this unity is absolute, unconditioned and independent. Taking substance in its strict sense, as that which has self-existence, and neither results from nor depends upon anything else, we have no experiential right to apply the term to mind. This is clearly recognized by Hermann Lotze, in modern times the most able advocate of spiritualistic physiology. In attributing substantiality to the mind, he means only to describe the mind as an independent element in the world, as a centre of action and endurance, without asserting anything as to its absolute nature. Hence also he declares that, from the existence of the mind as substance in this sense, no further conclusions of a semi-religious, semi-philosophical nature—such as those held by the earlier spiritualists—can be drawn; it opens no way to a knowledge of the fate of the mind, of its prospects in the future, or of its origin. He even agrees with Spinoza in thinking that, if the notion of substance is to be taken in its strictest sense, there can be only one substance; for only an infinite being, which has nothing beyond to condition it, can be "self-subsisting." A finite being is always limited by something else and dependent; and unless the extent of this dependence can be determined *a priori*, the definition of the mind as "substance" is not only misleading, but also useless and unfruitful.

What Lotze has especially in view in describing the mind as substance in the sense of an independent centre and point of departure, is its relation to materiality. According to his view, the chief characteristics of the mental nature should clearly show that this, in and for itself, is something different from materiality, and that a relation of interaction between mind and body must be assumed, however the relation may be conceived in detail. Here again, however, more is assumed than experience at first justifies. From immediate experience of our inner states absolutely nothing can be gathered as to their relation to other sides of being. Psychological experience gives only the internal mental phenomena themselves—not the manner in which they are connected with other phenomena. This is a special question, which psychology cannot in a one-sided way and directly determine. Other series of experiences besides the psychological must be brought to the solution of this problem; and it is of great importance that, as regards each individual series, no unjustified ideas shall be introduced—ideas which might prejudice the decision in one direction or another. We cannot determine at the beginning whether two different principles or substances are at the root of the mental and of the material. We see before us two provinces of experience, each with its special characteristics, and study these in order afterwards—but always under the guidance of experience—to try to determine their mutual relation.

This is also to the interest, as rightly understood, of metaphysical speculation itself. The human spirit will never let itself be debarred from brooding over the ultimate principles of that universal system of which it is a member. It will always seek to build its view of the universe on certain highest definitive ideas. But what it must learn, and should have already learnt, is this—that speculation may not mix itself up with the every-day affairs of experiential knowledge, may not anticipate the solution of purely experiential problems. It is not meant that speculation should wait until experience is exhausted; for that it never will be. But the really wise metaphysician is he who lets his ideas move in the direction already indicated by the leading features of experiential knowledge. He thus expresses only the thoughts which, more or less unconsciously, lie at the basis of experientially determined research, and carries them to their legitimate conclusions. He seeks an ultimate, definitive hypothesis, but the foundation is common to him and to the empiricist. Metaphysics therefore presupposes psychology as well as the other experiential sciences, and Lotze's conception of psychology as applied metaphysics will prove more and more untenable.

Psychology as here conceived is so far a "psychology without mind" that it makes no assertion about the absolute nature of mental life, or even about the question whether such an absolute nature exists. Just as little as physics pronounces upon transcendental questions (questions beyond the limits of experiential knowledge) in the province of outer nature, does psychology pronounce upon them in the province of inner nature. This does not mean that psychology may not make an essential contribution to the general conception of the universe. Nothing, on the contrary, can be of greater importance for such a conception than a knowledge of mental phenomena, of their mutual relations, and of the laws of their development. And precisely a conception of these phenomena, framed in accordance with experience, will be able to clear the points of view and to correct many prejudices.

In maintaining the empirical character of psychology as contrasted with metaphysical speculation, we exclude from psychology materialism as well as spiritualism. We have referred especially to the spiritualistic psychology, because it is of greatest interest, and has the most acute supporters. But it is obvious that materialism makes the same encroachments as spiritualism. Materialism also infers the existence of a substance, which is supposed to lie hidden behind the phenomena of consciousness, but finds this substance in matter, not in a spiritual principle. Spiritualism takes its stand on the difference between mental life and material phenomena, and thence infers a special mental substance, which in itself has nothing to do with matter. Materialism, on the other hand, argues from the connection of mental life with material, that the mind must be a material being. "It is enough for us to know," says Holbach (*Système de la Nature*, i. p. 118), "that the mind is moved and modified by material causes acting upon it. We are justified in concluding from this that it must be material." Broussais defined the mind as "un cerveau agissant, et rien de plus" (a brain in action, and nothing more). Both in what it maintains and in what it denies, materialism, equally with spiritualism, goes beyond the standpoint of experiential psychology. That in the course of the investigations proper to psychology a point may be reached whence judgment can be pronounced on these hypotheses, is quite another matter.

Psychology in and for itself, then, is not a part of philosophy, if by philosophy is meant metaphysics, a search after a general view of the universe; like the experiential science of external nature, it is a preparation for philosophy, a part of the foundation on which philosophy, in the sense of metaphysical speculation, should build, one of the witnesses it should call in. Nor is psychology philosophy, if by philosophy we mean a critical science of the nature and limits of knowledge: while psychology has purely the character of natural history, observes mental phenomena in their development and in their mutual relations, the theory of knowledge (sometimes called logic) tries by critical analysis to bring out the general principles of cognition. The theory of knowledge also, therefore, presupposes psychology.

On the other hand, philosophical thought also becomes one of the objects of psychology. As a form of mental activity, philosophy lies within the sphere of psychological observation. And in many ways philosophical research has played into the hands of psychological research; consciously or unconsciously, philosophical speculation always works with psychological elements, and in philosophical systems are deposited many profound psychological observations and ideas.

It is the merit of the English school to have shown that psychology is independent of metaphysical speculation. Descartes had, it is true, taken the decisive step of clearing the notion of mind from mythological ambiguities, by laying stress on consciousness as the mark of mental phenomena. He did not, however, hold fast to the experiential standpoint, but in reality laid the foundation of metaphysical spiritualistic psychology by representing the mind as "thinking substance" (*substantia cogitans*), instead of keeping to the phenomena of consciousness as the secure empirical basis. Kant's epoch-making philosophical reform became important for psychology through his critique of metaphysical ("rational") psychology, a critique the weight of which has been shaken only momentarily by romantic attempts to restore the old views.

8. We have tried to exhibit psychological inquiry as distinct in aim from the study of external nature and from metaphysical speculation. The immediate observation of self and immediate consciousness are the source from which both physiologist and metaphysician draw, but by them the source is frequently overlooked because their real interest is not this immediate observation, but that which they think they can deduce from it. Now, supposing that it is necessary to draw from this source, the question arises, whether independence in respect of subject-matter involves also independence in respect of method. This necessitates a closer inquiry into the nature and limitation of subjective observation.[1]

(*a*) The first difficulty presented springs from the fact that mental states are not abiding and steady objects like those which form the subject-matter of physical observation. As space is the special form of material phenomena, so time is the form of mental phenomena. What passes within us, in our thoughts and feelings, is unstable and changing. The botanist, when he spreads out a plant in front of him, or the chemist, when he conveys a substance into his retort, can observe at leisure the appearance of the objects under certain quite definite conditions. But a state of consciousness cannot be isolated in this manner, it has no limits in space; every moment brings in, or may bring in, new elements. In the moment when I wish to observe a state of consciousness, that state is already past, or has blended with other elements. Now it is certain that in one and the same instant several distinct series of ideas may pass through our consciousness; the self is not a unity in the sense that it excludes different or even conflicting currents. And it might be supposed that while the main current persists—as, *e.g.*, in the contemplation and admiration of a work of art—an under-current might at the same time flow, which would stand in the relation of observer to the first. In this way we might admire, and at the same time study the psychology of admiration. And certainly every one knows from personal experience states of this kind, in which, though something quite other than self seems to claim the whole attention, yet an inner spectator keeps up a running commentary. States of this kind cannot be entirely avoided by men in whom reflection has once been roused; and such a dual current may be of importance, particularly in an ethical connection, when it is a question of judging and gradually suppressing a pernicious current of mental life. Criticism as an under-current then makes itself heard, as an opposing motive, which seeks to overcome that previously dominant. But although such dual currents may be fruitful in psychological observation also, yet psychology must in its own interest give a caution against them. The capital of energy at the disposal of the mental life is in such states necessarily divided, and each individual current weakened. If a mood is to be thoroughly experienced, the under-current must be suppressed, and no heed paid to inner suggestions, lest they should withdraw a portion of the available energy. It must be added that the observing under-current is not indifferent, but always more or less diverts the main current. Conscious attention of necessity influences the state to which it is directed, and may in consequence partly destroy or change its own object. It substitutes art for nature.

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[1] For method of psychology may be compared J. S. Mill, *System of Logic*, book vi., chap. iv.; Bain, *Logic*, ii., pp. 275–292; Ad. Horwicz, "Methodologie der Seelenlehre" (*Zeitschrift für Philosophie und philos. Kritik*, 60 Band, 1872); Delbœuf, *La Psychologie comme Science naturelle*, Paris, 1876; Wilh. Wundt, *Logik*, ii., pp. 482–501; J. Sully, *Illusions*, chap. viii. [For standpoint, *cf. Ency. Brit.* 9th. ed. art. "Psychology" (Tr.)]

But what cannot be done at the moment of experience may be done later. During experience, we should only draw the net with all its contents to land, or, to use the simile of the botanist, collect the plants casually met with. What has been fully and clearly experienced will remain in the memory, and by means of the memory can be examined. The rhythmical alternation of self-forgetfulness and self-consciousness makes psychological self-examination possible, and psychological talent depends on the ease and elasticity with which it is possible to pass from one of these states to the other—in such a way as to keep clear and distinct in the moments of remembrance and reflection what has been immediately experienced, but not on the other hand to allow the immediate feelings to be disturbed by reflection. And yet the two states do not remain wholly unaffected by one another. Unconsciously—and therefore without detriment—the exercise of memory and reflection will cause a stronger light or a greater emphasis to fall on those elements in the immediate experience which are of especial psychological interest. We can make ourselves mental botanists, carefully preserving what is of interest for our psychological observation and our psychological understanding, while quickly passing over what has no such significance.

(*b*) But now, even if we succeed in overcoming this difficulty, a new one arises—namely, that on account of the individual differences in observers, there is no guarantee that they really see one and the same thing. Here they have not the object outside of themselves and among themselves, but each has it in himself!

This applies, however, more or less to physical observation also. Observation is a subjective activity; that which every one observes exists for him precisely as he observes it, and only by comparison can he infer that others observe the same thing (compare, *e.g.*, the perception of colours). To show a thing to some one else it is necessary to make him see it for himself, to rouse his own observing activity. What individual diversities constantly assert themselves here, may be seen, for example, in the fact that, when two astronomical observers calculate the time occupied in the movement of a star, there is always a difference, varying according to the observing individuals, and depending on the varying rapidity with which an impression is received and noted. On this account observations are usually begun by determining the "personal equation" in relation to other observers. From this it has been found that these individual differences are not constant, but subject to oscillations from day to day as well as in the course of years. A mutual check of this kind—though naturally in a much more imperfect form—is the only means of raising psychological observations above what is merely individual, or rather, of distinguishing between what is merely individual and what is of more general validity. Discrimination between what is typical and what is not typical must begin even within what is individual; if the individual wants to apprehend his own inner nature, he must disregard many observations, because they are isolated, and owe their origin only to single transitory situations. A purifying process of this kind every one involuntarily undertakes, and daily intercourse with other individuals leads, equally involuntarily, to a distinction between what in personal observations is general and universal, and what is merely individual. Psychological inquiry only continues, in both respects, what has been begun without conscious intention. But in its critical examination it must look for a support beyond the purely subjective method, the limitation of which already becomes evident. Even in the thorough checking of individual experiences, the purely subjective starting-point is deserted. Meanwhile, before we enter more closely into the objective psychological method, it is necessary to dwell upon the manner in which subjective observations are elaborated.

(*c*) Scattered observations form a chaos, which has to be set in order. The first piece of work is a classification, by means of which definite groups, or kinds, of mental phenomena are formed. The individual states are arranged in different classes according to their most striking characteristics. Such a classification is not, however, so easily made as was for a long time supposed. As classification, in the provinces of zoology and botany, led to the notion of eternal and unchangeable species—so that it now costs a hard struggle to furnish proof that these species are the fruits of a natural course of evolution—so psychological research for a long time thought its end had been attained when it reduced the various inner phenomena to various "faculties" of the mind—a procedure which conflicted strangely with the strictly spiritualistic conception of the unity of the mind. At the same time these "faculties" were regarded as causes of the phenomena concerned, and thus the need for a causal explanation was satisfied in a very convenient, though quite illusory, manner. In particular it was overlooked that in classification attention is given only to a prominent characteristic; that it is not therefore actual concrete *states* themselves which are classified, but the *elements* out of which a closer examination shows them to be formed. There is scarcely a single conscious state—as will be shown later in detail—which is only idea, only feeling, or only will. The psychological divisions may thus be very useful for preliminary instruction; but, if they are to have scientific value, they must be based on a thoroughgoing analysis, which searches out the individual elements and the laws of their connection and interaction. This analysis, which endeavours to go back to the constituent parts through combination of which our mental states have arisen, may often lead to a conflict with that which "the evidence of consciousness" seems immediately to include. Observation gives us only matters of fact, and teaches us nothing about the manner in which these facts have arisen. Direct consciousness in itself does not include any psychological theory, any more than it informs us whether it is the sun or the earth which moves. Our thoughts and feelings are in the highest degree complex mental products, fruits of a long, calm, and for the most part unobserved growth. The mere observation and description of them, therefore, are of value as a basis only.

The mental states follow one another, and call one another up. Now, can we lay down laws and rules for this interaction, and is it possible to show which are the elements in the different states of consciousness that lead from the one to the other? These are the questions with which psychological analysis is occupied. It thus proceeds in two directions, which are closely connected; it looks for common features, for that which reappears in the individual cases, and in this way lays down general empirical laws (*e.g.* for the association of ideas, the relation between idea and feeling, etc.); and, taking the individual states, it tries to discover the elements out of which each is compounded. A thought, a feeling, a resolve, is not an absolute unity; closer investigation shows it to be the fruit of a long course of development, during which it has received contributions from many sides. Love, conscience, and—to take a purely intellectual example—the idea of an external object, seem quite complete and self-contained, and yet it appears that they have their history, and that they depend on interaction between simpler mental elements, brought to light by psychological investigation. Analysis proceeds here from the complex to the simple, while in the former case it proceeded from individual instances to the general rule. The one form may be called *generalizing*, the other *elementary*, analysis. But it will be seen that the laws of succession and the mode of combination are closely connected, since the most general laws must be those which hold for the most elementary activities, for those mental functions which reappear in all mental phenomena.

It will never be known with complete certainty whether the explanation is exhaustive, whether we really have before us elements which admit of no further reduction. This in itself is a thing which holds good, not for psychology alone but for all our know-

7821

ledge; the ultimate fact to which we attain with regard to every single point is ultimate only for *us*. We cannot even tell whether advancing development will not lead us further, so that the limits of human knowledge may not yet have been reached. The point at which the individual student and the individual age stop may be passed by later times with richer experience and clearer principles. A noteworthy instance of a decisive change of the fundamental psychological conception is the predominant importance attributed, ever since Rousseau, to feeling as contrasted with the other sides of mental life; the elements of feeling having been ranged for a long time previously partly under the psychology of the idea, partly under that of the will. Irrespective of clearness of observation and of analysis, the possibility that the mental life of man undergoes slow changes cannot be excluded.

(*d*) Purely subjective observation is soon seen to be much too imperfect a means of psychological analysis. The individual constituents of states of consciousness can be clearly distinguished only when it is possible to proceed by way of experiment. Experiment differs from observation in this, that it does not wait for the appearance of certain phenomena, but tries to produce them under certain definite conditions which can be easily kept in view. This not only makes it easier to isolate individual elements of a phenomenon, but also, by enabling us to see how a phenomenon varies under different circumstances, opens a way to the discovery of its cause. It follows from the nature of things that it is chiefly the very simplest phenomena of consciousness which can be made the object of experimental inquiry. The emergence and mutual interaction of sensations, the simplest cases of association of ideas, and the time which these and similar elementary phenomena of consciousness occupy, have of late years been thus experimentally investigated. Midway between psychology and physiology a new science—psycho-physics or experimental psychology—is coming into existence.

In the departments in which experimental psychology is applied, not only can the *qualitative* analysis (the inquiry as to the constituents to which a phenomenon of consciousness owes its origin) be more precise and sure, but the prospect of a *quantitative* analysis appears to be opened, so that it may be determined in accordance with what scale certain phenomena of consciousness increase or decrease, and how great a time they take to arise. Psychology approaches by these investigations to the exact sciences, from which

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the non-spatial character of its subject-matter appears so widely to separate it.

The phenomena of consciousness do not arrange themselves, like external phenomena, in the form of space. One feeling does not lie to the right or the left of another, nor one thought above or below another. Different currents may move, as already noted, simultaneously in our consciousness; but we cannot, as with simultaneous external phenomena, determine their mutual relation by means of mathematical construction. There is wanting to us here a form of intuition, which—like space, the common form in which material phenomena are presented—might serve as the basis of such a construction. In the psychological province, therefore, we have nothing that fully corresponds to the general laws of movement, which comprise the most general principles of all exact explanation of nature in physics.

The phenomena of consciousness have, however, one property which affords an opening for the application of mathematics. This is their relative strength and distinctness, or, in other words, the degree in which they lay claim to the attention. Herbart had already found in this property a starting-point for his attempt to found a mathematical psychology. Afterwards Fechner tried to find a scale for the degree of strength of sensations (and of mental phenomena in general) by inquiring how they vary in relation to the increase and decrease of the physical stimulus. On his own experiments and those of others he based the rule that the increase of a sensation depends on the relation between the increase of the stimulus and the previously existing stimulus. To this we shall return in dealing with sensation (VA). In order to measure the mutual relation of sensations we require a unit, and Fechner proposed as such a sensation of so small a degree of strength that it can only just be noticed, or, as Fechner (with a phrase borrowed from Herbart) expresses it, that it just rises above the threshold of consciousness.

Fechner is certainly justified in holding that this degree of sensation is constant, when the attention is constant. But he himself allows that it is different in each of the different departments or modalities of sense (sight, hearing, etc.). It appears also to vary for the different species (qualities) of sensation within the same department (since the power of perceiving a difference in illumination is different with red and with blue light), as also for the different parts of the same sense-organ (the central and peripheral parts of the retina). Even if Fechner's view can be maintained in face of the criticism raised against it, it yet affords no general unit applicable to the whole of conscious life, not even one which is valid for all the most elementary phenomena of consciousness. It does not open up the road to a general psychical arithmetic. We cannot expect that we shall ever be able to establish formulæ for the calculation of the activity of conscience or of the poetic imagination. But the investigations of experimental psychology do not on that account lose their importance. The results attained are not merely of interest for the apprehension and understanding of the phenomena to which they directly relate; but, in consequence of the inner connection between the simpler and the more complex phenomena of consciousness, experimental psychology, even if it should always be limited to certain elementary departments, will be able—through the light thrown on these elementary departments—to give valuable hints for the investigation of the higher life of consciousness.

(*e*) The strictly psychological standpoint is confined to the phenomena of conscious life. We have emphasized this so strongly in order to avoid ambiguity and misunderstanding. We know directly just so much of the mental life as we know of the phenomena of consciousness. But consciousness is not a closed world; new phenomena are always emerging which, from that strictly psychological standpoint, we cannot deduce from anything earlier. Every new sensation seems to come into being out of nothing. We may be able to trace its changes and effects in consciousness, but can give no answer to the question how it comes there.

In addition to this, there are other reasons why we seek for means of supplying the defects of the strictly psychological standpoint. A comparison of our own observations with those of others is necessary, as already shown, that the one-sidedness due to individual peculiarities may be avoided, and, further, that we may make sure how far all the elements co-operating in the given psychological phenomenon have been really taken into account. Finally, for concrete psychological knowledge it is not enough to know the general laws of the connection of the phenomena of consciousness; in practice there appears such a diversity, such a jumble of possibilities, that we cannot deduce from the general psychological law the direction which the conscious life will take.

For every single individual and in every single situation the result depends on the natural temperament, on the conditions of life, and on the special experiences.

The strictly psychological standpoint must, therefore, be supplemented by physiological and historical (sociological) inquiries, or, as we may say (employing an expression introduced by Herbert Spencer), *subjective* psychology must be supplemented by *objective.* With reference to what has been brought out previously, it must be borne in mind that in the last resort objective psychology always rests on an inference by analogy, subjective psychology alone sees the phenomena themselves face to face. What we as objective psychologists think we discover of mental life outside our own consciousness, we reproduce in ourselves by means of a sympathy closely connected with analogy. But these analogies may afford indispensable correctives for our subjective observation.

Objective psychology comprises physiological and sociological psychology. The former is based on the close connection of mental life with organic life in general. Every explanation that physiology is able to give of the functions of organic life, may be of service, from any side whatsoever, to psychological knowledge. What has now to be especially emphasized is the way in which conscious mental life melts gradually into unconscious organic life. Physiology examines just those unconscious functions which precede the mental activities and form their constant basis. At the boundary line between the conscious and the unconscious, where subjective observation casts but faint light, physiology is able by its physical method to establish definite relations. At all points there is a close interaction between the conscious and the unconscious; it is not only the infant that awakes to consciousness out of the night of unconsciousness; sleep is every day a relative renewal of this night; in instinct, in impulse, and in habit we have forms in which the unconscious takes the conscious into its service, and the conscious life in its turn reacts on the unconscious by generating new habits and impulses. The physiological study of these elementary mental phenomena throws light also on the more highly developed mental life. Discussion will therefore turn on the question how far and with what alterations the teaching of the physiology of the nerves and of the senses about elementary mental life may be applied to the higher mental life; in connection with which question it must never be forgotten that even the physiological experimenter and observer, in his exposition of the elementary manifestations of mind, argues back to elementary consciousness from that which is fully developed. The true physiologist is not, in his study of the nerves and senses, interested in the states of consciousness as such, but in the physical processes with which they are associated. To the physiologist psychological experiences are only symptoms from which he infers physiological facts. He starts from the assumption that for every psychological experience there is a corresponding physiological process, which it is important to find out, and to explain in accordance with the general principles of natural science. For the present it is the more elementary phenomena of consciousness which best admit of this explanation, but a principle is in this way established which physiological psychology is fully justified in employing as the basis of the investigation of the higher mental phenomena also.

When we consider that mental life, as we know it, develops only under definite physical and chemical conditions and through a series of stages, the lower and higher of which shed a light reciprocally on one another, it is clear that psychology must be regarded—in spite of the independence reserved to it at starting—as a branch of general biology. Biology must put forward a conception of life applicable to all its stages, from the organic process of nutrition in its simplest forms to the most ideal process of feeling or thought. The biology of our time seems to be making an approach to an all-embracing biological conception of this kind, in regarding life in all its forms as an accommodation of the internal to the external. Conscious life marks the highest point of the evolution of life, shows us the highest forms under which living beings carry on the great struggle with the relations of the universe, and in this struggle unfold their nature. To treat psychology purely subjectively would be to overlook the great truth that everything which stirs in the mind is conditioned by the mind's place in the great system of nature.

Besides the physiology of the nerves and the physiology of the senses, the science of mental diseases is also an important aid to psychological insight, both by what it teaches about the connection between mental and bodily disturbances, and by its investigations into the forms and the course of development of the diseased mental life. In the latter respect it serves as a transition from physiological to sociological psychology, which deals with mental life as it reveals itself in movement and action, in literature and art. The material of sociological or comparative psychology is animal life, child life, savage races, the whole history of man, poetry, and biographies. Sociological psychology may thus be divided into many branches of study (child psychology, animal psychology, the psychology of races, of language, of literature, etc.), all of which lead into the great historical system, within which the individual consciousness develops, just as physiological psychology leads over to the physical system, in virtue of which the mental life shares in the life of the universe. The thoughts and feelings of the individual man at any given time are conditioned not merely by his inherited natural organization, but also by the atmosphere of historically evolved civilization in which he grows up. The physical and historical systems stand in close connection. The study of the influence of heredity forms (as from another side the study of mental diseases) a connecting link between physiological and sociological psychology, especially if we extend our view to the great horizon opened for us by the hypothesis of evolution. Through this hypothesis, organic nature, even the whole system of nature with its laws, acquires an historical character, as conversely we look at organic forces and laws in their influence on the historical development of human nature and of the relations of human life.

(*f*) We need only glance hastily at all these different sources to know that psychology cannot be a sharply defined science. It may be pursued by many methods and in many ways; here we have wished to bring out distinctly only the principle of the relation between the various ways. Thus there is not one psychology; there are many psychologies. But in consequence of the principle of the position occupied by subjective psychology, there will always—in spite of the growing importance of objective psychological study—be a natural and legitimate endeavour to utilize subjective psychology as a basis, and to collect around it as the centre the contributions made from other sources. In fact psychology has followed this method ever since Aristotle laid the foundation of experiential psychology. Only for a time did psychology, guided by a mistaken spiritualistic interest, endeavour to make its cause distinct from that of physiology and the other objective sciences, with the result the re-establishment of the connection came to be regarded as a new discovery. Subjective psychology has had to wait for objective; when it had arrived at a thoroughly clear idea as to its principle, it soon attained a certain completeness in its broad features, before physiological and sociological study was sufficiently developed to be able to work seriously into the hands of psychology. In this respect it may be said that in our time a turning-point has been reached.

Anyone who studies psychology out of philosophical interest will have a special reason for bearing in mind throughout the principle of the relation between the different sources of psychological knowledge, that the contribution which psychology is capable of yielding to our general conception of the universe may not be distorted. Here, as everywhere, it is important so to spread out for observation the content of experience, that what is actually given may be sharply distinguished from what is hypothetical, while, on the other hand, the common and constant features, the general laws, may come clearly and distinctly into view; for on these, not on the gaps which always remain in human knowledge, every progressive philosophical inquiry should be based.

9. Psychology stands, then, at a point where natural science and mental science intersect, where the one passes over into the other. In its principle is the central point round which the currents circle from either side, since all knowledge—being based upon human nature and organization—becomes directly or indirectly knowledge of mankind.

Psychology forms the basis on which the ideal mental sciences, logic and ethics, build. What is true and good can be determined only from the human standpoint, and cannot be understood without acquaintance with actual human nature. Logic and ethics set up ideals of human endeavour in thought and action. But if these ideals are to have any value in actuality, they must be rooted in it, and must therefore be based on a knowledge of the deepest and most general elements and powers of human nature. *Logic*, as the science of method, studies the special methods of investigation, and tries to trace them back to fundamental methods immediately arising from the nature of human consciousness; as the philosophical science of knowledge, it tries to lay down the general principles, and the consequent limits, of human knowledge; but without psychological insight into the development of the life of ideas, such an attempt can have no good result. *Ethics* tries to lay down general principles for the estimation of human volition and action, and to find out the direction in which, according to these principles, human life should be developed; but, in attempting this, it must always proceed from human nature as actually given, and from its possibilities as given by psychological laws. Among these possibilities ethics, after weighing them, makes its choice.

On the other hand, to confound logical and ethical ideals with psychological reality leads to the distortion of psychology. Psychology is concerned only with what *is*, not with what *should be*. Of course, that state of consciousness in which it becomes apparent to us that there is something we ought to do comes also within the province of psychology; like every other state of consciousness, it is here investigated. But psychology makes no valuation; it inquires only into the actual connection, and into the manner and the laws of its development, and leaves it to ethics to pronounce a judgment on the different states. Psychology regards mental phenomena as natural phenomena, and examines all of them with the same calmness and impartiality. The fact that psychology is independent of ethics was energetically maintained by Spinoza;[1] but it is not yet, by a long way, sufficiently recognized. There is still a disposition to regard certain forms of mental life as exempted by their sublimity and worth from explanation and analysis. But precisely those psychological phenomena which are of the greatest ethical value are not simple and uncompounded, since they are the crowning point of a long and rich process of development. From their value, therefore, it follows that they are the very opposite of an exception to general psychological conditions. It is in all cases a mistaken notion that to esteem a thing of value and to explain it causally are necessarily incompatible and opposed. Of course theoretical inquiry may expose illusions; in each individual case it calls for a fresh testing of the justice of the valuation; but, in itself, it may very well be compatible with the determination of worth. It is only a *blasé* person, or one under the influence of mythological superstition, who supposes that a phenomenon loses its value because it is understood. Meanwhile it must be admitted that the harmony between valuation and causal explanation is as yet only coming into existence; but psychology teaches that it must grow by a necessity of nature, since knowledge and feeling cannot permanently move in opposite directions.

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[1] See my work, *Spinoza's Liv og Löre* ("Spinoza's Life and Teaching"), Copenhagen, 1877, p. 120 *seq.*

II

MIND AND BODY

1. IN the foregoing investigation it has been established that knowledge of the mental and knowledge of the material are derived from two distinct sources. The question which now arises is concerned with the relation between these two different provinces of experience. This question does not lead, as here presented, to any metaphysical inquiries. We employ the word mind only in the sense of consciousness, as a collective term for all our inner experiences (sensations, thoughts, feelings, and resolutions), and ask what guidance experience affords as to the connection of these experiences with those whose content is what moves in space. Our standpoint is thus, to begin with, purely *empirical* or *phenomenal*, not metaphysical or ontological. According to the view given in the preceding chapter, the work of metaphysics begins only when experience has been thoroughly explored, and its tendencies and possibilities have been discussed.

Here, as everywhere, the popular mode of apprehension is distinguished from the scientific in being a compound of experience and metaphysics. Popular apprehension often fastens, with instinctive assurance, on certain prominent experiences; but it explains and circumscribes these experiences under the unconscious influence partly of traditional, partly of undisciplined metaphysical ideas. Scientific apprehension, on the other hand, endeavours first of all to become acquainted with the sources of its assumptions, and to distinguish sharply between experience and explanation. Consequently there arise for it difficulties and problems which the popular mode of apprehension does not feel.

So long as the phenomena of consciousness and the material phenomena, each set with its special characters and internal connection, are neither of them clearly conceived, the problem of the relation between mind and body does not, properly speaking, exist at all. If by mind is understood vaguely a moving principle, an inner force of things, then there is no occasion to see any kind of difficulty; for such principles and forces can be postulated with equal right in any province whatsoever. It is only when the notion of mind is definitely limited to conscious life and its facts, and when material phenomena, on the other hand, are conceived as a self-contained world with its own principles and laws, that the difficulty of a connection between the two provinces makes itself felt. Thus the problem does not come from a dogmatic and absolute distinction of two substances or essences; we do not know at the outset whether the difference is one of essence or not; we know only that there is a difference, and ask what is involved in this phenomenal difference, given in experience, and what follows from it. In order to answer this question, we shall place side by side the main features characteristic of the two provinces of experience.

2. The first great feature of material phenomena is the fact that they appear in the form of space; that directly or indirectly they may always be traced back to a movement in space. This distinguishes them from states of consciousness, which can be represented as spatial only symbolically. This characteristic does not in itself contain anything by which the material is sharply defined and closed off as a world in itself. For we might conceive these spatial movements as brought about by something non-spatial. The material world would in that case lie open to influences from without.

But scientific research makes such a possibility always more inadmissible. It now applies in all departments the principle that every material movement must be explained by another material movement.

The very first principle on which exact natural science is based is, that the state of a material point (rest or movement in a straight line) can be altered only through the influence of another material point. Physics marks off its special province by this principle (the law of inertia), having found that it can attain to a scientific knowledge of nature only by employing this law as basis. If there were in a material point a capricious force, which might at any moment move it in this or in that direction, or leave it at rest or set it in motion indifferently, natural science would be impossible.

This principle cannot, from its nature, admit of rigid proof. It is the fundamental assumption with which natural science comes into existence; wherefore it was laid down by Galileo, the founder of physics. It cannot be deduced, as has been sometimes attempted, from the universal principle of causality. For a material phenomenon, a material movement, so far as its nature is concerned, might very well have a cause, without this being necessarily a material cause: the universal principle of causality may be satisfied in many different ways. But it is a matter of fact that physical science as hitherto developed has been made possible only through the closer determination and limitation which the law of inertia gives to the principle of causality in the province of material nature. Nor can the law of inertia be fully established by experience; it does not, as some have supposed, express a "fact." It can only be proved that *the more* a body is preserved from external influence, *the more* it remains in the state (rest or movement in a straight line) in which it already is. The first proposition of dynamics can therefore be only approximately established in experience. Its chief importance is that it sets the problem—to trace material phenomena back to other material phenomena as their cause.

The like holds true of a more special principle, which gives its character to modern natural science, the principle, namely, of the conservation of matter and energy. Modern chemistry is based on the assumption, confirmed by numerous experiments, that, in all changes of matter, the sum of material particles (atoms) remains the same. When bodies acquire new properties, this is to be explained by the changed combination and disposition of the parts. By the emergence and disappearance of a material object is meant the composition or separation of atoms which existed previously, but in other combinations. Chemistry, in explaining in this way all changes of matter by the different movements of atoms, applies in its particular department the principle that material phenomena must be explained by other material phenomena. And as matter is assumed to persist through all changes, so the sum of the energy (*i.e.* capacity for work, for overcoming resistance) manifested in material nature, is assumed to remain the same. If energy appears to come into existence or to be lost, this is an appearance only. Some examples will throw light on the meaning of this principle.

Through chemical combination heat may arise. But the precise amount of heat which arises through the combination disappears when the combination is broken up. Now, whence does this heat come, and whither does it go? It arises as the equivalent of that elastic force which held the parts asunder before their combination, and it recovers its equivalent through the tension with which, after separation, the parts are kept away from one another. The force with which a stone falls to the ground depends on the height from which it falls; but the height depends in its turn on the force with which the stone has been raised. When the stone is stopped by the earth, force seems to be lost, for the stone certainly cannot set the earth in motion; but in this case again the loss of force means only its translation into another form—into heat. This is what happens, too, when a movement is not altogether stopped, but only checked by friction. The force which a body loses through friction is not really lost, but turned into heat. When water dashes against a mill-wheel, heat is produced. Conversely heat can produce mechanical movement, as when the steam expanded by heat drives the piston, which in its turn sets in motion the wheel of the locomotive. And it has been proved by repeated and uniformly successful experiments, that the amount of force or energy[1] lost under the one form obtains its exact equivalent under the other form, so that the same amount of the same kind of energy can be restored.

However much the different forms of energy taken individually may change, their sum therefore remains the same. But by energy in that case we must understand not merely actual performance of work (living force, actual energy), but also possible performance of work (tension, potential energy), the work stored up, which under certain conditions can be set free and applied. When Sisyphus succeeds in rolling his stone up the mountain, he really accomplishes something: his work is not lost, for the stone represents a greater amount of energy at the top of the mountain than when lying at the foot. In both cases it is at rest; but the potential energy is greater in the former case than in the latter, as becomes evident so soon as the stone is put in motion. The misfortune of

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[1] On account of the ambiguity of the term force, that of energy is usually employed, nothing more being meant by it than the capacity to perform work or to overcome resistance.

Sisyphus consists only in his not being able to direct the greater potential energy to something useful to himself or to other men; he is always obliged to begin again from the beginning. It is therefore the sum of the actual and potential energy which—so far as we can regard the universe as a self-contained whole—remains always the same.

The doctrine of the conservation of matter and of energy may be formulated either as a law, as a hypothesis, or as a principle. It has been experimentally demonstrated in respect of so many kinds of matter and force, that it may justly be styled a law of nature. The question is whether it holds for all kinds of matter and force, and from this point of view—as a universal law of nature—it has only hypothetical validity. It can never be more than approximately established by experience, since the whole content of nature will probably never be known to us. To which must be added, that we do not know any absolutely isolated and self-contained totalities; and only for such totalities can the doctrine hold good in its strictest sense, since beings or systems related to other beings or systems give off energy to these or receive energy from them. All that we can show is, that *the more* a material system can be shut off and isolated, *the more* will its matter and energy continue to persist. As regards the extent to which this doctrine admits of experimental proof, it resembles the law of inertia. Like the latter, it has the great importance of being a methodical principle, which impels us to seek equivalents for every portion of matter or of energy that seems to come into existence or to disappear.

3. One class of beings, however, not only popular apprehension, but for a long time science also, was disposed to regard as exceptions to this general doctrine. Organisms, with their special forms of development, their power of self-preservation in face of an external world, seem to be little worlds capable of drawing life from sources within themselves. For a long time any explanation of the phenomena of organic life by means of the general forces of nature was regarded as materialism. As, however, on the other hand, it was clear that the conscious mind is not the direct cause of organic processes, which so often take a direction quite contrary to the will of the individual, a so-called vital force was interpolated between the conscious mind and the body, to explain those phenomena. This conception, the doctrine of so-called Vitalism, could not of course fail to note that living beings stand in a rela-

tion of constant and complicated interaction with the external world, are every instant being influenced and giving off influences, and that the course of their development and dissolution is conditioned throughout by this relation. The "vital force" had therefore to go through a similar process. But what led Vitalism astray was the special manner in which the organism responds to all external influences. That a ball rolls when we push it, seems to us quite natural; but that plants turn to the light, that nutriment is converted into flesh and blood, or that the fingers contract when the palm of the hand is lightly touched, appears to us very extraordinary, for in these cases the response appears to stand in no relation to what has called it forth. Vitalism here makes the mistake of regarding the organism as an absolute unity, while it is in reality an extraordinarily complex whole. An influence, when received, is transmitted from part to part in this whole, and thus gradually undergoes a complete change of aspect. It is converted partly into other forms of energy, partly into potential energy or tension, and finally serves partly to set free potential energy in the organism. Research, in endeavouring to trace these changes step by step, begins to understand them, and to see that the ultimate result may be something totally different from what was taken into the organism in the first instance. It perceives that the organism, by means of the store of potential energy collected in its tissues and circulating in its humours—which form as it were an external world within the organism (a *milieu intérieur*, to use Claude Bernard's pertinent expression)—must confront the external world with an independence quite other than that of the inorganic forms of existence. Organic response to the appeal of the outward world (irritability) must be the richer and more special in character, the more stored-up energy there is to be set free. The doctrine of the "vital force" is really only a mythological way of expressing the amazement which the unique character of organic phenomena excited. Modern physiology has been led to a higher point of view by analysis of the individual factors in the vital process. The idea of the one indivisible vital force came in this way to give place to the conception of an exceedingly complicated interaction, in which individual manifestations of force may be traced back to general forces of nature, and individual material particles to general elementary matter. This is the principle with which physiology now works, and to which therefore we also must adhere in the present inquiries, even though no one may maintain that it is, or perhaps ever can be, carried out everywhere. The important point is, that to it are due all the advances physiology has made. However many difficulties remain, especially in the province of morphology, no explanation which contradicts this principle will for the future be accepted. In any case the burden of proof rests on those who appeal to the intervention of immaterial causes.[1]

For everything that arises or disappears in the organism, physical or chemical equivalents must be looked for, either within the organism or outside it. Organic life is thus drawn into the great system of nature. Under the influence of light the conversion of inorganic matter into more complex organic matter takes place, more particularly in the green cells of plants.[2] The organic matter thus collected is used up in the functions of the plant and the animal. Metabolism depends on the conservation of energy, and on metabolism in its turn depends the activity of organic beings. The form and the manner in which the accumulated potential energy is applied depends on the structure of the organism. There is a fund of energy in every organic cell, but the use made of this fund depends on the structure of the organs.

Thus the principle of the conservation of energy presses its claims ever more closely. Vegetative life, the functions of alimentation, might perhaps be yielded to it with a good grace. But even the nervous and muscular systems cannot escape subordination to it. The energy consumed in all nervous and muscular activity is stored up during the process of alimentation. The nervous and muscular systems themselves are only highly perfected (differentiated) apparatus for the exercise of functions which are carried on in an extraordinarily simple form even in uniform, structureless protoplasm. Even here an excitation at one point of the organism can be transmitted through the mass, and can set up movement at quite different points or in the whole. The increasing division of labour makes distinct systems necessary in the higher organisms, but this more elaborate formation (differentiation) is not exempted from the general elementary laws.[1] These still hold good, only in extraordinarily complex and often impenetrable relations. Chemically and physically, the action both of nerves and muscles is different during and after function from what it is before function. The blood that circulates in muscles when in action, contains several per cent. less oxygen and more carbonic acid than the blood in quiescent muscles. The nervous tissue—the fibres as well as the central organs—cannot function without an ample supply of blood, which contains the material necessary to the increased change of matter that results from function. The brain is affected by every change in the circulation of the blood ; both anæmia and hyperæmia cause a disturbance in its activity. Brain-work uses up the organic capital just as much as the activity of any other organ.

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[1] *Cf.* Panum, *Indledning til Physiologien* ("Introduction to Physiology"), 2nd ed. (Copenhagen, 1883); Charles Robin, *Anatomie et Physiologie Cellulaires* (Paris, 1873), Introduction; Claude Bernard, *Leçons sur les Phénomènes de la Vie* (Paris, 1878), (note especially the following definite statement: "Quelque soit le sujet qu'il étudie, le physiologiste ne trouve jamais devant lui que les agents mécaniques, physiques, ou chimiques," p. 52); Exner, *Physiologie der Grosshirnrinde* ("Physiology of the Cerebral Cortex"), 1879; Hermann's *Handbuch der Physiologie*, ii., 2), pp. 189-191.

[2] The power of forming organic combinations out of inorganic elements is not wholly wanting in the animal organism, although it is in the plant organism that its most favourable conditions are found. *Cf.* Pflüger, "Ueber die physiologische Verbrennung" ("On Physiological Combustion"), *Archiv für Physiologie*, xi. p. 345.

What really takes place in the nervous system during its activity has not yet been made clear. This only is clear, that it can be nothing material that is transmitted from one end to the other (such as the so-called "animal spirits," formerly believed in). Probably the nervous process consists in a change passing through the nerve fibres, a release of tension, caused by external excitation (the irritant), and transmitted from part to part, so that one nerve-element serves as irritant in relation to another. The tensions thus set free seem to be of a chemical nature ; but there are various difficulties in the way of a purely chemical theory of the nerves.[2]

4. (*a*) The plant uses up its energies wholly in the life of nutrition. It absorbs and secretes matter, grows and propagates. It finds what is required for this in its immediate proximity, and must so find it in order to live. Air, water, light, &c., must bathe the surfaces of the plant, if it is to keep alive.

The plant is like a fœtus, it remains in the maternal bosom of nature, and has not made its way out to independent, individual life. The fœtus obtains its sustenance directly from the maternal organism. Animal life proper is conditioned by not having everything thus prepared for it. The animal must search, work, and fight in order to satisfy its wants; it must therefore face the external world as a whole, must be able to gather together its energy, and to apply it in definite directions. At the same time it must be able to take into account relations and facts which do not directly affect it at the moment. These requisites are supplied by the nervous system; through it the various parts and departments of the organism are brought into close mutual relation, so that the organism becomes a whole in a stricter sense than can be said of the plant; and the nervous system makes it possible for the relations of the external world to determine the movements of the organism, not only directly but also indirectly.

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[1] "The nerves are to be regarded in the first instance merely as those points in the tissue through which the effect of the excitation is most easily transmitted, without its being necessary for us to suppose that there are from the beginning more mysterious forces in them than in the other parts."—Lotze, *Allgemeine Physiologie des Körperlichen Lebens* (Leipzig, 1850), p. 386. It has been thought a proof of this, that the effect of narcotics on the nervous tissue differs from their effect on other organic tissue in degree and rapidity only. *Cf.* Laycock, "Further Researches into the Functions of the Brain" (*The British and Foreign Medico-Chirugical Review*, July 1855), p. 185 ; Claude Bernard, *Leçons sur les Phénomènes de la Vie*, p. 289 ; Herbert Spencer, *Principles of Psychology*, i. p. 631 *seq.*

[2] *Cf.* L. Hermann, *Allgemeine Nervenphysiologie*, 1879 (Hermann's *Handbuch der Physiologie*, ii., 1), pp. 186-193 ; Panum, *Nervevävets, de kontraktile Vävs og Nervesystemens Fysiologie* ("Physiology of the Nerve-Tissue, of the Contractile Tissue, and of the Nervous System") (Copenhagen, 1883), p. 56.

It is true that it has not yet been possible to establish the existence of nerves in the lowest animal organisms, while on the other hand many plants execute functions similar to those which in the higher animals are executed by means of the nervous system; still, speaking broadly, the plant and the animal may be described as two types of life, the one of which stands only in direct, the other both in direct and indirect, inter-relation with its surroundings. The higher we come in the scale of animal life, the greater is the part played by the nervous system, because the inter-relation with the external world extends in ever wider circles, and thus grows less and less direct and momentary.

(*b*) The simplest form of nervous activity is the so-called reflex movement, where an excitation is carried along an afferent (centripetal) nerve-fibre to an internal centre (a ganglion), and there in its turn frees an impulse which, through an efferent (centrifugal) nerve-fibre, sets in motion a muscle or some other organ (*e.g.* a gland). Here we have the simple schema, which seems to be repeated at all stages in the development of the nervous system, only in extraordinarily numerous co-ordinate and subordinate strata. As a rule, the ganglion not only sends outward-going fibres to the organs in which movement is to be excited, but inward or upward-going fibres also pass from it to higher centres, which in this way receive impulses from several sides—impulses which may in part strengthen, in part inhibit, one another. The ganglion itself exercises an inhibitory influence on the impulse, for, as can be shown by experiment, the course of a nervous process is much slower in the brain and spinal cord than in the peripheral nerves. This inhibition seems to make it possible that the impulse, before being transmitted further, may be changed by the influence of other impulses. And to this central elaboration of peripheral excitations is due the fact that the movement which they set free is determined, not merely by local and momentary influences, but also to a certain extent by influences from the whole organism. The central nervous organs are therefore modifying and combining organs.

We have a very simple example of this relation in the suckers of the cuttle-fish. Each sucker on the arm of this animal has its own special ganglion, and so can be made to contract and suck when an object is brought into contact with it alone. This may happen even if the arm is separated from the rest of the animal. There is here a nervous function in its simplest form—transmission of the excitation to a simple central organ, and in this organ the setting free of an impulse towards contraction. But now the ganglia of all the suckers are connected both with each other and with the highest centres of the animal (the caruncle), so that, in taking hold of an object with the whole arm, the animal may set all the suckers in action at once. The single elementary nerve-function then takes its place as member of a whole system of functions.

This relation between subordinate and principal centres can be established also in the case of higher animals, though the closer connection and interdependence of the organs make it more difficult to survey the relations, the higher we ascend in the scale of development. The independence of the subordinate centres is greater in cold-blooded animals (as for example the frog, which on this very account is the frequent subject of physiological experiments) than in warm-blooded, and among the latter it is greater in birds and rabbits than in the ape, and much greater than in man. The complete removal of both cerebral hemispheres can be survived only by animals in which the cerebrum has not attained any great degree of development. The higher forms of mammalia, on the contrary, perish quickly when deprived of the entire mass of the cerebral hemispheres.

(*c*) *The vegetative organs* are connected by afferent and efferent fibres with the spinal cord and brain, and are regulated from these centres. Nevertheless, there appear to be special nerve-centres, of a certain degree of independence, either within, or belonging to, some of these vegetative organs. If the heart of a frog is cut out, it continues to beat for several hours, thus proving its relative independence of higher centres. Experiments (on dogs and rabbits) have shown that the pulse beats faster when, through section of the nervus vagus, the heart is freed from its connection with the medulla oblongata. In moments of violent terror the heart of the rabbit stands still, then beats faster than before: after section of the nervus vagus, no influence upon the beat of the heart is perceived. The same holds good of the intestines. The peristaltic movements may continue, after the connection with higher centres is broken.[1]

The *spinal cord* is an important seat of reflex movements. In a headless frog reflex movements in all directions can be set up by a sufficiently strong stimulus on any part of the skin. What is remarkable in these movements is their co-ordination and purposiveness. So far as it has been possible, by section of the spinal cord and application of the stimulus below the division, to produce reflex movements in mammalia, these have seemed to be to a certain extent co-ordinated, but not so purposive as in the case of frogs. The spinal cord seems in the higher animals to act more and more exclusively as the connecting link between the brain and the peripheral parts of the organism.[2]

In the *medulla oblongata* are localized a number of centres of importance to the continuance of life. These centres can act independently of the higher parts of the brain, and can reflexly set in motion very complicated mechanisms. This is so, for instance, with the respiratory centres, the centre for regulating the nervous system of the heart, for the secretion of saliva, for deglutition, and for the excretion of urine.[3]

A frog deprived of the cerebrum, but still retaining the mesencephalon (the brain-ganglia situated in front of the medulla oblongata), proves itself still in control of the motor apparatus required for independent movements; but it appears to move only when stirred up by a definite sensory excitation. It lacks the power of taking the initiative. It has this superiority over the mere spinal frog, that it can be moved by slighter excitations, and is consequently not so passive. While the spinal frog is of course not susceptible to light, and sinks when thrown into the water, the mesencephalon frog avoids a very dark shadow, and when it is thrown into the water, the stimulus given by the movements of the particles of water causes it to swim. But some outer impulse is always required to set it in motion. Similar features are found in birds and mammalia, when these survive the removal of the cerebral hemispheres. They cannot take the initiative, or help themselves in cases of any difficulty, but, on the other hand, single elementary excitations call forth movements, some of which are very complex. The physiological significance of the *cerebellum* is not yet certain. It is thought by some to help in the co-ordination and combination of movements.[1]

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[1] M. Foster, *Text-book of Physiology* (London, 1877), p. 81; Eckhard, *Physiol. des Rückenmarks* (Hermann, ii., 2), p. 71; Exner, *Physiol. der Grösshirnrinde* (Hermann, ii., 2), p. 289.

[2] M. Foster, p. 420. [*Cf.* Ferrier, *Functions of the Brain* (2nd ed. 1886), ch. ii. (Tr.)]

[3] [*Cf.* Ferrier, ch. iii. (Tr.)]

(*d*) The special work reserved to the most important part of the brain—the *cerebrum*—can be no other than this: to elaborate and combine the elementary excitations received in the medulla oblongata and in the brain-ganglia, and to employ, in accordance with the result of this elaboration, the apparatus lying ready in these lower parts of the brain. The cerebrum forms the keystone to the ingenious structure of the nervous system. The nearer it is approached, the more complicated become the relations, the more numerous the nerve-cells and connective fibres. Here are laid down lines which render possible the most complex interaction between different impulses. When we reflect that every excitation works through release of tension in organic cells, and that the result of this release in the individual cell may be connected in the cerebrum with results similarly obtained from millions of other cells,[2] we grow giddy at the thought of the combinations which are here possible.

The question whether the cerebrum functions as a whole, or whether the several functions are localized each in its special tract, has received conflicting answers, and is even yet a subject of dispute among physiologists. Gall, the founder of phrenology, maintained a very far-reaching localization of all the higher and lower mental powers, but brought the idea of localization into disrepute by his uncritical method and his fantastic cranioscopy. The reaction against his doctrine is represented by Flourens, who argued from his experiments that any part whatsoever of the cerebral hemispheres may be injured or removed without detriment to the brain-functions.

This theory prevailed for about half a century, during which time it was placed in doubt only by Broca's discovery (1861) that the seat of the most important central organs of speech and discourse is in the third frontal convolution of the left hemisphere. A new period of brain physiology began with the experiments undertaken by Fritsch and Hitzig (1870). These investigators thought it possible to prove that stimulation of definite points on the surface of the cerebrum sets up definite movements of definite parts of the body. Later, Hermann Munk in particular has tried to prove the existence in the cerebrum of distinct organs for the apprehension and recognition of the elementary sensuous impressions (a sphere of sight, a sphere of hearing, &c.). There would thus be grounds for again believing in a localization, a division of labour in the cerebrum, but with this great difference, that only the elementary activities of the mind would be localized, not thought proper or "intelligence."[1] But even with this limitation, the new theory of localization is not undisputed.[2] Goltz enters a protest against it, taking up an intermediate position between Flourens's doctrine and the new theory. He does not deny the possibility of a localization of the various cerebral functions, and he disputes the justice of Flourens's assertion that any part of the cerebrum can act vicariously for any other. The removal of large parts of both hemispheres gives rise to permanent weakness. But the weakening of definite sensory and motor functions, which accompanies the removal of certain parts of the surface of the cerebrum, Goltz explains partly as phenomena of inhibition due to the operation. If the injury is not too extensive, the animal recovers, a fact of which the localization theory gives only the forced explanation that new special centres are formed in brain-tracts where no such centres previously existed.[3]

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[1] [Ferrier, chs. iv. vi. (Tr.)]

[2] Meynert and Bain independently calculated the number of nerve-cells in the cortex of the human cerebrum to be a thousand millions (Meynert, *Zur Mechanik des Gehirnbaues* (Vienna, 1874), p. 7).—"A portion of grey matter upon the surface of a convolution, not larger than the head of a very small pin, will contain portions of many thousands of nerve-fibres" (Beale, quoted by Maudsley, *Physiology of the Mind*, p. 117).

While it is still disputed how far a localization of the special sensory functions exists in the cerebrum, the disputants agree that the higher mental manifestations are not tied to definite cerebral tracts. Both Goltz and Munk unite with Flourens in thinking that the most important cerebral functions, the actions from which we conclude intelligence, feeling, passion, and natural impulse, cannot depend on definite sections of the cerebrum.[4]

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[1] Intelligence has its seat everywhere in the cerebrum, and nowhere in particular; for it is the abstraction and the resultant of all ideas springing out of sensuous perceptions."—H. Munk, *Ueber die Funktionen der Grosshirnrinde* (Berlin, 1881), p. 73.

[2] [The reference to Soltman, given in the German ed., is here omitted at Dr. Höffding's request, later experiments having led to contrary results. (Tr.)]

[3] Goltz, in *Pflüger's Archiv für Physiologie*, vols. xx. to xxvi.

[4] Goltz, in *Pflüger's Archiv*, xxvi. p. 35. [A full discussion of the question of localization will be found in Ferrier, ch. vii. *seq.* (Tr.)]

(*e*) One or two examples will serve to indicate the physiological relation of the cerebrum to the remaining nerve-organs. The study of disturbances of speech seems to lead to the conclusion that, in the parts of the brain which lie below the surface of the cerebrum, only the arrangements for the mechanical execution and combination of sound-producing movements are to be found; while the formation of syllables and words, belonging to speech proper, takes place in the surface of the brain. The primitive sounds of the little child may perhaps have in the medulla oblongata alone the conditions of the mechanism which controls them, while the fully formed sounds of a language, which are joined in syllables and words, and are conditioned by the development of intelligence, involve the action of higher centres.[1] The movements set up from the mesencephalon, medulla oblongata, and spinal cord have the character of involuntary movement. On the other hand, actions which are directed by the will, inasmuch as they involve more or less distinct ideas of movements, can be executed only with the co-operation of the cerebrum.[2] While, as above noted, elementary sense-excitations exercise their influence even upon animals which have been deprived of the cerebrum, the proper grasp and comprehension of the excitation is possible only where the cerebrum is uninjured. After extensive injury to both the cerebral lobes at the back of the head, a dog no longer grasps the significance of what he sees and hears. He does not turn when threatened with the whip, does not notice his food unless it is set in the usual place, is not startled by noise, does not obey when called, remains unaffected by tobacco smoke, and will eat a dead dog without any sign of disgust. On the other hand, a dog in this condition goes round obstacles lying in his way, and avoids dazzling light. Goltz and Munk give much the same account of the animal's condition, but disagree as to the explanation. According to Munk, this "soul blindness," as he calls it, is connected with the injury to a certain definite portion of the surface of the brain. According to Goltz, any extensive injury to the cerebrum produces a similar condition. Munk explains it psychologically through the loss of the memory-presentations, by which new excitations may be recognized and understood, while Goltz explains it through a general intellectual dullness, especially perhaps want of attention. Both explanations bring out the importance of the cerebrum in relation to the subordinate centres.[1]

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[1] Ad. Kussmaul, *Die Störungen der Sprache* (Leipzig, 1877).

[2] Munk, p. 51 *seq.*; *cf.* Goltz, in *Pflüger's Archiv*, xxvi. p. 6.

But the cerebrum stands not only in a positive, but also in a negative, relation to the subordinate nerve-organs, inasmuch as it is able to inhibit their activity. The vegetative functions are for this reason carried on more vigorously during sleep, when the cerebrum does not interfere so strongly as in the waking state. Even in the lower animals, where its position is by no means so prominent as in the higher, this inhibiting influence is noticeable. When the headless frog recovers after the operation, its mobility becomes even greater than before. The subordinate centres respond to excitations more readily than the higher. This is a simple consequence of the fact that in the higher centres excitations have to go through a long process—must be confronted, so to speak, with so many other claimants, that the individual excitation cannot get its own way so easily and absolutely as in the less complex organs.

The increased vigour of the subordinate nervous processes after the removal of higher centres is explained by some as due to the fact that the quantity of nervous activity which an afferent nerve arouses in the lower centre is now spread over a smaller sphere, and must consequently produce speedier and stronger effects. But all the phenomena cannot be thus accounted for. Strong cerebral activity, as in sudden and powerful stimulations of sense, in agitation of feeling, in the exercise of thought, seems to influence subordinate centres immediately, preventing direct excitations from taking effect as they would otherwise.[2]

Through such inhibiting activity that which passes in the higher centres becomes of importance to the lower. We know, to take a simple instance, how sneezing may be prevented by a sudden sense-excitation. A violent emotion or pain inhibits the action of the heart (under the influence of the brain through the medulla oblongata and the nervus vagus) and so causes fainting. Great dread may prevent secretion of saliva, a circumstance which lay at the bottom of the "ordeal of God," in which the accused person was held to be guilty if he could hold rice in his mouth without wetting it. Weeping can be prevented by a sudden, gripping stimulus; peristaltic motions, by an affection of the nervus splanchnicus. It is not only by single sense-stimuli that inhibiting forces are liberated in this way: more complicated brain functions exercise a similar influence; and in a later chapter we shall see that an important part of the supremacy of the will is connected with this. All that need be noted at present is, that the phenomena of inhibition are the stronger the fuller the organism is of life, and weaker when the organism is in a state of fatigue. In this respect the condition of the central organ is of decisive influence; if it is tired, badly nourished, or affected by cold or strychnine and certain other poisons, the reflex movement increases in speed, strength, and extent. With "nervous" persons, whose unhealthy state is connected with disturbances of nutrition in muscles and nerves, there is found a strong propensity to reflex movements and spasms.[1] So far as there is any occasion to talk of reflex movements (in the sense of immediate motor responses) within the brain itself, the brain is a complete little world, possessing in its myriads of cells and fibres the means for internal strengthening or inhibition, for internal debate, and for the struggle for supremacy among all the impulses that can arise in it.

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[1] Goltz, in *Pflüger's Archiv*, xxvi. p. 42 *seq*; Munk, p. 29.

[2] Eckhard, *Physiol. des Rückenmarks* (Hermann, ii. 2), p. 37.

5. From the purely physical point of view, which is also the physiological, everything that takes place in the nervous system, even in its highest centres, is a conversion of forces, since an excitation from the external world, or from within the organism itself, sets free the tension accumulated in the nervous tissue. The physiological way of expressing it is to say that the excitation (the irritant) calls forth a reaction, which consists either in a movement of the muscles or a secretion of the glands, or in a more comprehensive process in the centres of the nervous system. But it is evident that in the case of some of the phenomena included in these points of view, a third point of view must be established—namely, the psychological, for with the physico-physiological processes are linked certain states of consciousness. Then comes the question of the relation between these different points of view. Is the one subordinated to the rest in such a way that, as the physiological point of view is included in the physical—if the word physical be taken in the widest sense—so the psychological should be included in the physiological as one of its special forms? Is that which is presented to us from the one point of view perhaps the cause or the effect of that which is presented to us from the others?

Something is still wanting for the clearing up of this question.

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[1] Wundt, *Physiol. Psychologie*, i. pp. 260-263 (3rd ed. i. pp. 273 *seq.*): Panum, *Nervevävets Fysiologi* ("The Physiology of the Nervous Tissue"), p. 196 *seq.*

For, while we have given a sketch of what in physiology is of importance for our problem, we have not yet given any detailed account of the characteristics of the conscious phenomena. The psychological point of view, therefore, has not yet been clearly presented. It is the special object of all the following investigations to give an account of the mental life, and it will of course be impossible to give it now. But since I have chosen to treat of the general problem of the relation between mind and body before dealing with the more special psychological questions, which in many ways presuppose a definite conception of that problem, nothing remains but to present here a preliminary description of the psychological phenomena, reserving to the following chapters the more complete proofs of its validity.

Consciousness in general is in the same position as particular forms or elements of consciousness (colours and sounds, *e.g.*); a description or definition of them is impossible, because they are fundamental facts, and cannot be traced back to anything simpler and clearer. But this does not exclude the bringing out of their most important characteristics. Attention may be directed namely to those marginal cases, in which consciousness is just gliding over into unconscious states; and we may observe and investigate the transitions from weaker and more obscure to stronger and clearer consciousness, through which the higher states of consciousness are conditioned.

A completely uniform and unchanged condition has a tendency to arrest consciousness. Uniform impressions (such as the rippling of a fountain) have a somniferous effect. The more change and variety are kept at a distance, the more consciousness gives place to unconscious states. Staring at one special point produces a sort of border state. Thomas Hobbes, the founder of English psychology, maintained that to have always the same feeling and to have none at all were one and the same thing.[1]

By uniform treatment, as, for instance, by being stroked up and down regularly with the hands, or by being made to fix attention on a single point, a person can be put in a *hypnotic* or somnambulant condition. James Braid, the discoverer of hypnotism, gives as the condition of its appearance, "monoideism,"[2]—that is, absorption in one idea.

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[1] *De Corpore*, xxv. 5; *cf.* Leibniz, *Monadologie*, § 24.

[2] *Cf.* Preyer, *Die Entdeckung des Hypnotisms* (Berlin, 1881), p. 41 *seq.*, 81; Richet "Le Somnambulisme provoqué" (in the treatise *L'Homme et l'Intelligence* (Paris, 1884. [Sully, *Illusions*, pp. 185, 187. (Tr.)]

Concentration of attention on a single thought has the same effect as absorption in one sense-affection. The mystic tries to lose himself in the Deity, to him an absolute unity, and to become one with the Deity; therefore he strives to avoid all change of ideas, and the more he succeeds in doing so, the more nearly he approaches to ecstasy—a condition which is described as being raised above all consciousness. To attain to this end the mystics often made use also of hypnotism.

By changes, consciousness is aroused from sleep or from a state of abstraction. If awake, consciousness is quickened and enhanced by contrasts and changes. We feel cold more intensely on coming out of a warm room; light appears of extreme brilliancy when we come out of deep darkness; we are thoroughly conscious of quiet and repose only after the noisy town or hard work.

But change and contrast are not in themselves enough. They give a sudden shock, a surprise; but unless the effect they produce were preserved, it would be only like a quickly vanishing ray of light. It is possible to imagine a living being constituted so as from time to time to have quite isolated sensations. Such separate rays would not correspond to sensations as we have them; in us the single elements of consciousness are not isolated, but are from beginning to end in closer or looser connection. Such a connection is necessary, to enable even the single impressions, each for itself, to take effect. Then the earlier conditions must admit of *retention* or *reproduction*, to make a connection and an interaction among the different elements of consciousness possible. This is corroborated by the fact that want of connection and interaction among the elements of consciousness is a sign of approaching dissolution. As mental disease advances, fixed ideas are formed, rendering free natural stir and conflict among ideas impossible. At a later stage not even fixed ideas can be held fast and applied; no comparisons can be instituted, or combinations made. Finally there ensues a complete absence of images and thoughts: sensuous impressions are no longer elaborated, memory is almost extinguished, and the power of speech for the most part lost.[1]

The two conditions we have mentioned do not, however, suffice for a full account of conscious life. They would serve equally well for organic life. The power of preserving and reproducing earlier states is found in unconscious nature. But what this lacks is the power of *recognizing* the states reproduced. With unconscious beings one moment falls outside the other, even though the content of both is the same. In recognition, on the contrary, the distinctions of time and space are annulled, things which have been experienced at different times and in different places being immediately brought together. In recognition and in memory is expressed an inner unity, to which the material world affords no parallel.

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[1] *Cf.* Griesinger, *Die Pathologie und Therapie der psychischen Krankheiten* (Stuttgart, 1861), pp. 323-351.

Conscious life has thus three main characteristics: (1) change and contrast as condition of the individual elements entering consciousness; (2) preservation or reproduction of previously given elements, together with connection between these and the new elements; and (3) the inner unity of recognition.

If we look back on our previous states of consciousness, they come before us as a series of sensations, representations, and feelings—as a stream with succeeding waves. It may often seem to memory as though this series were composed of independent, separate units, only externally combined. Some psychologists (in particular Hume) have consequently described consciousness as a mere succession of ideas without inner bond and connection, or more precisely as the series of our possible and actual sensations (John Stuart Mill). But the fact that it is impossible for the individual elements within what we know as consciousness to stand out absolutely isolated, shows distinctly the inaccuracy of this description. Every individual element belongs to consciousness only through its union with other elements. The emphasis is thus to be laid on the union, the connection, and not on the members in their individuality. The peculiarity of the phenomena of consciousness as contrasted with the subject-matter of the science of external nature—material phenomena—is precisely that inner connection between the individual elements in virtue of which they appear as belonging to one and the same subject; and this connection has its typical expression in *memory*, which may on that account be called the fundamental phenomenon in the mental province. That which has escaped the memory may still indirectly, through its after-effects, exercise a great influence on our conscious life, but is no longer a part of it. In the physical world memory can be spoken of only figuratively. Everywhere, where there is development, later events are conditioned by earlier; and by virtue of the law of the persistence of energy, nothing happens, however insignificant, without exercising its effect on what happens afterwards. But only on the supposition of a consciousness can that which is past be itself re-experienced, actually enter into a later mental connection, so that the distinctions of time are annulled. The different stages at which this fundamental psychological phenomenon appears, and the forms it takes, will be discussed in a later chapter.

It here remains to add that this intimate union and unity may vary greatly in degree, and that in our psychological experience we never meet with it in the highest degree imaginable. Beneath the clearness and the connection in our consciousness there is always a more or less obscure chaos; the original elements must always arise in it as something given, to serve as material for its activity. There is thus a passive and an active side in the nature of consciousness, the former corresponding in the first instance to the diversity of the elements, the latter to the unity and the connection of all conscious content. The energy of consciousness is manifested in the way in which the individual elements are connected and brought into interaction. Kant, therefore, rightly characterized consciousness as a synthesis. Synthesis, at whatever stage in the development of conscious life we look for it, presupposes a given manifold. It combines individual sensations into percepts, forms representations into concepts, and so forth. Work of this kind is carried on from the very threshold of consciousness; this is implied in the fact that consciousness approaches more closely to unconsciousness, the nearer it comes to the point where there is only a single element. Consciousness, in awakening to clearness, finds its special work in full progress. Synthesis, to employ Kant's words, is "a blind, but indispensable, function of the soul, without which we should have no knowledge whatsoever, but of the existence of which we are scarcely conscious."[1]

It is especially this property of conscious life which makes its origin so great a problem. For even if we admit the existence of elementary sensations in less developed organisms, still the decisive test is the connection, the unity of these sensations. The *first* sensation cannot, of course, be attached to any other mental element; how, then, can synthesis and consciousness exist here? Similar questions arise wherever we go back to the beginning. The question of the origin of organic life presents a like difficulty.

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[1] Kant, *Kritik der reinen Vernunft*, 1st ed., p. 78 (Kehrbach's edition, p. 95). [Max Müller's translation, p. 69.]

It is a principle of physiology that every organic cell springs from another cell (*omnis cellula e cellula*); but the *first* organic cell must have originated under quite different conditions.

The history of psychology shows that different schools of thought have laid different weight on the two sides in the nature of consciousness. The German school (Leibniz, Kant, Hegel) lays paramount stress on synthesis, activity, unity. The English school (and Herbart in Germany) has given prominence to the passive or mechanical side, to the diverse elements and their reciprocal interaction. Each school is especially strong in the treatment of different problems. The English school devotes attention rather to the elementary, real side of conscious life, to the manner in which the mental structure is raised by the combination of fundamental elements; the German school, on the contrary, attends more to the connection and the unity which from beginning to end are the marks of consciousness. The more recent English school appears to meet the German school in the recognition of the fact that the individual sensation or idea exists only as a member of a connected, conscious series, and that consciousness therefore can never be conceived as mere sum or mere product.[1]

German psychology has often exhibited a tendency to approach metaphysics; English psychology, on the other hand, has approached the mechanical sciences, and has transferred analogies from them to the conception of mental phenomena.

In the account of consciousness just given, we have confined ourselves mainly to the formal side. Only in the more special psychological discussion shall we be able to deal more closely with the real side. In the present connection we must content ourselves with calling attention to the fact, that the unity of mental life has its expression not only in memory and synthesis, but also in a dominant fundamental feeling, characterized by the contrast between pleasure and pain, and in an impulse, springing from this fundamental feeling, to movement and activity.

Synthesis is the fundamental form of all consciousness. But the activity which finds expression in synthesis is in every individual case directed to a definite end. This end may be more or less conscious; but the activity directed to it will be accompanied by a feeling of pleasure, the interruption of this activity by a feeling of pain. The capacity to feel pleasure and pain, quite as much as the synthetic activity, presupposes a unity, an inner central point, into relation with which the changing diverse elements of consciousness are brought. The relation between the formal and the real side of consciousness we shall examine more closely in another connection (V. B. 5).

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[1] On this point see my book, "*Den engelske Filosofi i vor Tid*" ("The English Philosophy of our Times"), (Copenhagen, 1874); German translation, 1889.

6. If we now try to institute a comparison between the activity of consciousness, as we have provisionally described it, and the functions of the nervous system, a wealth of parallel traits will present themselves. It might even be said that the need for a visible image of the mind—a need which so often asserts itself at the unscientific standpoint—is actually met by Nature herself in the form and method of function of the nervous system. The next problem, then, is to explain the image—to find out the relation between the symbol and the thing symbolized.

(*a*) The great importance of the nervous system, as we have seen, lies in its serving as the connecting central organ of the several parts of the organism, guiding their activities into inner harmony, and enabling them to present a combined front to the external world. Exactly the same task is fulfilled by consciousness in its own way. In it things scattered in space and time are brought together, the wave-beats of the conditions of life are expressed as a rhythm of pleasure and pain, and in memory and intellectual activity is manifested the closest concentration to be found in the whole of our experience.

(*b*) To become conscious of something presupposes a change, a transition, a contrast. The content and energy of consciousness must have their equilibrium disturbed, the attention must be aroused. An arousing, an excitation (irritant) is in like manner essential to the function of the nervous system. The excitation operates by setting free restrained force, by upsetting equilibrium in the nerve-fibres and nerve-centres.

(*c*) But the excitation acts not only on single centres; owing to the highly ramified connection between the different nerve-centres, it sets free a series of processes which reciprocally augment or inhibit one another, so that the total effect depends on the result of this physiological debate. To this corresponds on the psychological side the calling up of associated ideas by simple sensations. The simple sensation has thus not a simple, but a very complicated, effect. The psychological relation between sensation and memory has its physiological parallel in the relation between the arrival of an excitation in the central nerve-organs and the interaction among these organs. Not only from the purely physical, but from the physiological, point of view, the effect of the spark on the powder is the most appropriate representation of what here takes place.

(*d*) The formation of sensations and representations takes a certain amount of time. Of all our movements, the unconscious are most quickly executed. The greater the caution, the slower the action. The more complicated the operations undertaken, the longer the time required. In like manner the nervous process takes a certain time, which physiology has begun to measure. All that here interests us is the circumstance that movement in the nerve-fibres passes more quickly than movement in the nerve-centres (the grey substance), and more especially that the central nervous functions (the psycho-physical functions), with which the activity of consciousness seems to be linked, take more time than the purely physiological functions. It accords with this, that actions, undertaken at first consciously, become unconscious after frequent repetition and exercise, and more quickly executed. The child learning to read looks closely at each letter until he recognizes it, and devotes special attention and care to its accurate pronunciation. But by degrees he learns to read aloud, without thinking about the formation of the letters and the character of the sound. So with dressing and undressing, walking, dancing, swimming, and many of our daily occupations. The shorter the time that passes betwen the excitation and the movement it sets up (the reaction-time, the physiological time), the more unconsciously does the action take place.

(*e*) To the physiological hierarchy of principal and subordinate nerve-centres, and to the relative independence of the latter, corresponds the fact that in our organism there are activities which under normal conditions are not accompanied by consciousness, but which become conscious if taken out of their normal conditions. The functions of nutrition, for example, are usually carried on unheeded. They give rise to sensations accompanied by pleasure or pain only when they are especially favoured or hindered. When food is wanting the blood ceases to flow to the stomach, which has then nothing more to work up, and from the consequent want of nourishment for the nerves arises, as some suppose, the feeling of hunger. This feeling is a particularly good example of the transition from unconsciousness to consciousness, since it passes through a whole scale of degrees, from the first vague feeling of discomfort up to the most terrible torture.

The psychological parallel to the relation between higher and lower nerve-centres appears from another side in the phenomena of movement. We have just seen how new reflex actions may result from constant and repeated functioning of the higher centres. But the higher centres also, as already noted, exercise an inhibiting influence on the involuntary movements which can be set up in lower centres. As the exercise of new reflex movements corresponds to the positive work of the will, so the inhibition of natural and involuntary movements corresponds to its negative work. Our natural as well as our artificial education consists in partly accustoming, partly disaccustoming, ourselves to something. This will be treated more in detail in the chapter on the psychology of the will; here we would only suggest that even the struggle between "the spirit and the flesh" has its physiological counterpart.

(*f*) Finally, a parallel appears between the different sides of conscious life and the different organs of the nervous system. In cognition and feeling consciousness turns as it were an open side to the not-self; where it thus lies open, it is mainly receptive and appropriative. In will (at its several stages of instinct, impulse, purpose, and resolve) we have, on the other hand, the response of the conscious life, the mental reaction. Precisely the same double-sidedness is found in the nervous system, in the contrast between the sensory and motor organs. To conceive thought, feeling, and will as localized, each in its special place in the brain, would be to revive the errors of phrenology: no one of these, looked at psychologically, is a single and simple process, the course of which may be conceived as in one definite organ; they inter-penetrate, as will be proved later, to such a degree that it is only in the abstract mode of speech that we can talk of them as different processes. Here we refer only to the general schema of the nervous system: an in-going movement, a central elaboration of it, an out-going movement. The same schema serves for the conscious life.

7. We must assume that these parallels have a real significance; there must be an inner connection between conscious life and the brain.

The matter might be most simply settled, if we could immediately observe that conscious life is attached to the brain, a certain state of consciousness being accompanied by the sensation of a certain state of the brain. In severe mental work we do, indeed, think we feel something in the brain; but it is not the function of the brain itself which is then felt. Such phenomena, according to Griesinger,[1] appear to correspond to processes connected with the membranes of the brain and their supply of blood.

It is evident, moreover, that it was long before the connection of consciousness with the brain was fully established. In ancient times the seat of the mind was held to be in the blood, in the diaphragm, or in the heart. Among the ancient Greeks, only Alcmæon and Plato taught that we think with the head. Herophilus, the great Alexandrian anatomist (300 B.C.), was the first to transfer the mind to the brain, relying on definite facts—that is to say, on the observation that the nerves, and especially the sensory nerves, are collected in the brain as the last centre.[2] But this anatomical proof is not enough to establish the conviction of the real connection between consciousness and brain. However a series of comparative observations and experiments has here been decisive.

In the lowest animals a nervous system has not yet been discovered. In Mollusca and Articulata there is only slight centralization of the nervous system; at the best the central nervous system consists of a ring of nerve-ganglia. The lowest vertebrate, the Amphioxus, has only a spinal cord, no brain; and in the lower classes of vertebrates the brain is developed in a much lower degree than the spinal cord.

The more the cerebrum preponderates over the other brain-organs, the more highly do we find the conscious life developed. The higher centres occupy far more room in the brain of man than in that of animals, the immediate centres for sensation and muscular movement having apparently the ascendency in the latter. The greater or smaller wealth of convolutions in the brain is also proved to stand in connection with the higher or lower stages of development of conscious life. The brain of the more intelligent species of dog has more convolutions than that of the less intelligent species; man is in this respect far in advance of apes, which in other respects come so close to him in structure; the cerebral hemispheres of distinguished men are very large, and rich in convolutions.

With this agrees the constitution of the brain in the fœtus and the new-born infant. In the earlier states of the fœtus the cerebrum, in man as in all vertebrates, lies in front of the other portions of the brain without covering them. In the course of development it covers (in man and to some extent in apes) first the pons Varolii and ultimately the cerebellum. The cerebrum of new-born children—both in structure and in power of functioning—is little developed, while the subordinate brain-apparatus is ready for immediate use.

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[1] *Die Pathologie und Therapie der psychischen Krankheiten*, 2nd ed., p. 26.

[2] Exner, *Physiologie der Grosshirnrinde* (Hermann's *Handbuch*, ii., 2) p. 193.

Finally, it is proved by experiments that sensations arise only if excitations are conveyed from the surface of the organism to the brain, and that voluntary movement is possible only if the motor-centres in the brain are uninjured. By removal of the cerebrum the conscious life of animals which can survive the operation is weakened, deliberation and initiative are lost. Conversely, a dull and undeveloped conscious life (as in idiots) is connected with a defective nourishment and defective development of the brain; and the advancing dissolution of conscious life in mental disease is accompanied by gradual dissolution of the brain, especially in the cerebrum. If the veins which supply arterial blood to the brain are tied up, there ensues an unconscious state, which leads to death.[1]

8. Now, whither are we led by this formal agreement and this actual connection between conscious life and the life of the brain?

No hypothesis can be admitted which does not allow due weight to all the facts we have brought forward. In the nature of the case only four possibilities can be conceived; (*a*) either consciousness and brain, mind and body, act one upon the other as two distinct beings or substances; (*b*) or the mind is only a form or a product of the body; (*c*) or the body is only a form or a product of one or several mental beings; (*d*) or finally, mind and body, consciousness and brain, are evolved as different forms of expression of one and the same being. These several possibilities we now proceed to examine, relying on the results set forth in the preceding sections. Whichever we may prefer, it is clear that we can adopt it only as a provisional hypothesis. At the same time it must be carefully borne in mind, in the following examination of the different hypotheses, that, as already noted (II., I.), we are here concerned with the relation between mind and body only from the point of view of experiential psychology, and are not in search of a final philosophical or metaphysical theory. Possibly the result arrived at must be reconsidered before it can take its place in a philosophical theory: but our present task is not the establishment of such a theory. The hypotheses now to be examined lie on the borders between experiential science and metaphysics; but we are concerned with them only from the point of view of the former.

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[1] Exner, pp. 193-206; Griesinger, pp. 418-444; Tardieu, *Etude médicolégale sur la Folie*, 2nd ed., pp. 85-89, 119.

(*a*) The ordinary notion is that the mind acts upon the body and the body upon the mind. It is perhaps thought that we feel this immediately, although this seems to be at once contradicted by the want of agreement as to the existence of a mind, independent, and distinct from the body, and by the fact that in any case it is only indirectly that we have come to know with which part of the body the mind is more particularly connected. "But are there not unquestionable facts which prove the truth of this view? An excitation of a sense-organ is transmitted to the brain, and there passes into sensation, while conversely, our will is able to set the body in motion!" But it is just the relation between what passes in the brain and states of consciousness that is the question, and if the facts were as stated, we should have no reason for asking it; we should already know the answer. If the state of the brain, with which the sensation or the decision is connected, does not itself become an object of consciousness, it is impossible to discover whether tnere really is a causal relation, or a relation of interaction, between the brain and consciousness or not. There is no justification, therefore, for maintaining, as a fact, that a bodily process causes a mental process, or the reverse. And it will be admitted, on further reflection, that, even if physiology could give a scientific explanation of the condition of the brain which ensues when I am struck by a stone, the feeling of pain aroused in me would not be included in the physiological explanation. Physiology, like every natural science, explains a material process by means of other material processes. Its assumptions are not framed to include a case in which one member of the causal relation shall be spatial, the other non-spatial.

The supposition that a causal relation may exist between the mental and the material is contrary to the doctrine of the "conservation of energy." For at the point where the material nerve-process should be converted into mental activity, a sum of physical energy would disappear without the loss being made good by a corresponding sum of physical energy. To this it has been answered that it is, indeed, inconceivable how material activity can pass into mental activity, but that, taken strictly, every transition, every conversion of force, is inconceivable to us; and, moreover, that the doctrine of the conservation of energy requires only that a certain corresponding sum of energy shall come into action instead of that which has disappeared, it being all one whether this equivalent be of a physical or a psychical nature. But this would be a bold and unwarranted extension of the doctrine of the conservation of energy, which, in the form in which it lies before us, is a purely *physical* doctrine. Such an extension would imply the possibility of finding a common measure for the mental and the material. Now what denominator is common to a thought and a material movement, or what common form serves for both? Until such a common form can be pointed out, all talk about an interaction between the mental and the material is, from a scientific point of view, unjustified. So long as we confine ourselves to the material we are on safe ground, and so long as we confine ourselves to the mental we are on safe ground; but any attempt to represent a transition from physical to psychological laws, or conversely, brings us face to face with the inconceivable. In the causal concept, as in all concepts which condition our apprehension of reality, there is contained an epistemological problem. As at all points where we approach the boundary lines of our knowledge, difficulties arise, but a difficulty multiplies itself when the causal concept is employed to connect two factors which have no common measure.

The ordinary notion, indeed, leads involuntarily to a doctrine of homogeneity, since mind is apprehended as material when it is thought of as affected by material movements, and the material is turned into something mental when regarded as open to mental influence (as Plato makes reason "persuade" matter).

It will easily be seen that it avails nothing to say that the mind may not indeed be able to increase the *sum* of physical energy in the world, but that it can alter the *direction* of the applied energy. A physical movement does not change its direction except under the influence of a physical force of a certain strength. So that this subterfuge also of necessity makes the energy of consciousness a physical energy.

The application of the causal conception presupposes not only a common measure, but also a difference in time. The question which has been raised, as to whether cause and effect are simultaneous or not, rests partly on a misunderstanding, and in any case does not concern us here. On the other hand, it cannot be denied that the conception of causality would never have been formed had not phenomena been subject to change. If everything were uniform and unchangeable, we should have nothing about whose cause we could inquire. The relation of causality presupposes the occurrence of an event. If the relation between mind and body, or consciousness and brain, is a causal relation, there must be a difference of time between the process in the brain and the act of consciousness. This, however, is contrary to the view suggested by physiology. As we have seen, the aim of modern physiology is to conceive all organic processes as physical or chemical. It does not boast that it has explained the origin of organic life; it maintains only that where it has attained to a comprehension of anything in the region of organic life, this has *in every case* been by the tracing back of organic phenomena to physical and chemical laws. If, then, there is a transition from physiological function to psychological activity, from body to mind, physiology at any rate, working with its present method, cannot discover it.

To admit such a transition implies that the physiological process is *interrupted* at certain points, namely when the stimulus becomes a sensation, to be resumed by a psychological process, under changed conditions, when the mind has recovered from the material stimulation and responds to it with an act of will. The idea of a causal relation between mental and material forces upon physiology an interruption of this kind. But physiology will hardly be induced ever to admit such interruption. Apart from the physical, which is also a physiological, difficulty involved in the breach of the doctrine of the conservation of energy, the nerve-process must from the physiological standpoint be conceived as a connected course. In this department very much is still unexplained.[1] The relation between nerve fibres and nerve-cells is very obscure; the physical properties of the ganglion-cells, and consequently the physical origin of the simplest reflex movement, are not yet understood; it is not even quite certain that the ganglion-cells form the connecting link between the afferent and efferent nerve-fibres. Nor has it been possible to point out the anatomical connection between the centres of the centripetal and those of the centrifugal nerves in the spinal cord.[1] But in spite of all this, physiology cannot permit its boundaries to be invaded from without. Its fundamental thought is the universal coherence of organic life; it tries to explain the more complicated processes by reducing them to the simpler; it learns from the lower phenomena how the higher are to be understood, for it takes the principles of structure and of activity to be the same throughout. Thus *e.g.* the doctrine of reflex movements throws a light on the way in which the highest cerebral functions are to be explained,[2] though we are not thereby justified in concluding straight away that all cerebral activity is reflex activity. So far as we can speak of final results in the physiology of the brain, this represents the brain as a republic of nerve-centres, each with its function, and all in interaction; but there is nothing to indicate the possibility of the physiological process breaking off at any point to pass into a process of a wholly different kind.

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[1] *Cf.* Ditlefsen, *Menneskets Histologie* ("Histology of Man") (Copenhagen, 1879), p. 582. "The new discoveries as to the structure of the nerve-fibres have not advanced our knowledge of the relation between them and the cells; for the time being we must tentatively hold that the nerve-cells are centres of the nerve-fibres, and address our histological investigations to the task of producing a satisfactory morphological understanding of this physiological fact."

Of course there is always one way of escape; to deny the universal validity of the doctrine of energy. This doctrine is not experimentally proved, and as we have seen, cannot, strictly speaking, ever be so proved. But according to the general rules of methodology, we may not, in framing our hypotheses and in judging of them when framed, enter into conflict with leading scientific principles. And in modern natural science, the doctrine of energy is such a leading principle. If, therefore, an hypothesis is in conflict with this doctrine, the fact tells at once decidedly against it.

The ordinary doctrine of interaction (the doctrine of the *influxus physicus*, as it was called in earlier times) is presented in a stricter, more metaphysical, and in a vaguer, more indefinite, form. In its metaphysical form it appeared in the writings of Descartes, who conceived of mind and body as two substances, absolutely distinct in kind, but nevertheless acting on one another. Here was made the hasty attempt, already mentioned, to prove the soul to be an independent substance, a view which exchanged the standpoint of experiential psychology for that of metaphysics. But it was precisely the distinct and clear form which Descartes gave to the current doctrine that to an extraordinary extent contributed to lay bare its weak points. It was abandoned, as the history of philosophy shows, as soon as it was set forth with all its consequences. To Descartes, therefore, belongs the credit of having set the problem of the relation between mind and body. For to the current notion in its vaguer form there is no difficulty in this relation. With legitimate heedlessness, the practical usage of speech ignores theoretical difficulties. Ordinary language no more regards the fact that physiology and psychology are opposed to the notion of brain and consciousness acting on one another, than it respects the doubt of Copernicus as to the sun really moving round the earth. Moreover, the practical usage of speech has been formed under the influence of a partly spiritualistic, partly materialistic, metaphysics.

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[1] C. Lange *Rygmarvens Patologi* ("Pathology of the Spine"), p. 24; Eckhard, *Physiologie des Rückenmarks und des Gehirns* (Hermann, ii., 2), pp. 7-19, 61 *seq.* [Ferrier, p. 60 *seq.* (Tr.)]

[2] After Marshall Hall (1833) had laid down the theory of reflex-movement, Laycock (1840) pointed out that its principle must be applied to the physiology of the brain also. ("On the Reflex Action of the Brain. *The British and Foreign Medical Review*, 1845). Independently, as it seems, of Laycock, Griesinger expressed the same thought in his treatise "Ueber psychische Reflexaktionen" (*Archiv für physiologische Heilkunde*, 1843.)

(*b*) An end is put to this inconsequence and vagueness, when one of the two factors, whose connection is the point in question, is without more ado struck out. And since the perception of the external, material world takes the leading part in our ordinary, every-day ideas, while our inner self-consciousness is with difficulty educated to a like clearness and distinctness, it is perhaps the most natural thing to identify materiality with reality, and to conceive of the mental as a form or effect of the same. Certainly *materialism* is historically older than the current doctrine of an interaction. Homer and the earliest Greek philosophers (before Socrates and Plato) are materialists; even in the teaching of the Christian Fathers before Augustine materialistic notions predominated. The older forms of materialism did, however, draw a distinction between mind and body, though regarding both as material substances (*cf.* 15). Modern materialism does away with this duality, usually treating the mental as a function or a side of the material. In modern times materialism has found a solid basis in the doctrine of the conservation of matter and energy and in that of physiological continuity. It has full justification as against every spiritualistic line of thought which leads to the setting of external limits to the series of physical and physiological causes. As a method of natural science, materialism is unanswerable. But it is another affair when the method is converted without more ado into a system. It has a perfect right to treat all changes and functions of the organism, in particular of the brain, as material; but as a system it goes farther, and maintains that the phenomena of consciousness are only changes or functions of the brain, and in this consists its encroachment.

Karl Vogt gave in his time great offence by declaring (in his *Physiological Letters*) that "as contraction is the function of the muscles and as the kidneys secrete urine, so, and in the same way, does the brain generate thoughts, movements and feelings." It might appear as though he had here left a choice between two ideas: to conceive of thoughts either as *matter* or as *movement*. The first mode of conception, though it comes closest to direct apprehension, and was on this account chiefly adopted in the ancient materialism, has on closer consideration something so quaint about it, that it needs no further discussion. And in Vogt's comparison of the origin of thought and the origin of secreted matter doubtless the chief emphasis is to be laid on the secreting activity, not on the product. The principle, however, remains the same. Even among cautious physiologists with some philosophical training, the doctrine that conscious activity is a function of the brain may be sometimes met with. And yet it would seem as though just the strict physiological use of the term function must contradict such a doctrine. To say, *e.g.*, that contraction is the function of the muscle only means that it is a certain form and a certain condition of the muscle in movement. As Goethe has put it, "Function ist Dasein in Thätigkeit gedacht." The muscle when functioning is just as material as the muscle when at rest, and that which has not the properties of the material cannot be the form of activity of something which is material. The conception function (in the physiological sense)[1] implies, just as much as the conception matter or product, something presented as an object of intuition in the form of space. But thought and feeling cannot be pictured as objects in space or as movements. We get to know them, not by external intuition, but by self-perception and self-consciousness,—a source from which the physiologist also draws, without being always clearly conscious of the fact, when he inquires into the relation of conscious to organic life. By many round-about ways it has been at last discovered that certain definite phenomena of consciousness are connected with the function of certain definite parts of the brain. It is not even doubted that the highest of all the activities of consciousness have their corresponding cerebral functions,—as the most beautiful melodies are not too sublime to be expressed by notes. But activity of consciousness and cerebral function always come to be known through different sources of experience. The encroachment of materialism consists in the fact that it effaces this essential distinction without more ado. In quietly attributing to the brain the power of being conscious, or in even perhaps making the brain the subject of the manifestations of consciousness,[1] materialism is really returning to a fanciful mythological standpoint.

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[1] In the mathematical sense, however, we have a perfect right to say that consciousness is a function of the brain, since experience shows a certain proportionality between the degrees of development of consciousness and of the brain. Conscious activity would then, to speak precisely, be a mathematical function of the physiological function of the brain.

We are attending here principally to *empirical* or *phenomenological* materialism, that is to say, to the view which holds as the direct result of experiential science, that the phenomena of consciousness are forms or effects of material phenomena, so that all reality may be traced back to movements in space. Here we move in the region not only which we ourselves prefer, but in which materialism has always believed itself to move. Materialism has never observed that, even if all its assertions are admitted to be just, it yet always overlooks something which gives rise to a new, and for it a terrible problem; namely the circumstance, that movement in space is known to us only as an object of our consciousness. For the theory of knowledge, such notions as consciousness, idea, and intuition lie deeper than such notions as matter and movement. For this reason an absolute and decided materialism was possible only in ancient times, before the awakening of more deeply penetrating philosophical reflection. Democritus is the only consistent materialist. None of the modern materialistic writers can speak with the calm and the certainty with which Lucretius in his majestic verses sets forth the doctrine of Democritus. Modern materialists for the most part confess that, even if we can reduce everything to matter, yet we cannot know what matter is in itself. Thus La Mettrie, Holbach, Cabanis, not to speak of the wild, rambling inconsistencies of the most recent writers (Büchner, Moleschott).

But what we have here urged against materialism, is not the epistemological inconsistency exhibited in its desire that conscious life shall recognize, as the absolutely original and only reality, something which is given only as an object of consciousness, and which can be represented and recognized only through the activity proper to consciousness. Our task is only to find out to what view the given facts impel us; and the result of our criticism of materialism is that it offends against the conceptions derived from experience itself.

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[1] Ch. Robin, *e.g.* defines "sensibilité" as follows (*Anat. et Physiol. Cellulaire*), p. 540, "Ce mode de la névrilité est charactérisé par ce fait, que les éléments nerveux qui en jouissent, après avoir reçu une impression du dehors, la transmettent de ce point à un autre où ils (*sic*) la perçoivent." A similar mode of expression is employed by Broussais. But what idea is really conveyed by nervous elements perceiving and apprehending anything?

(*c*) In treating of *monistic spiritualism*, as the third possible hypothesis, we must always hold fast the distinction between a phenomenological and a metaphysical way of looking at things. Very many confusions relative to the problem before us are the result of overlooking this distinction. Spiritualism, like materialism, has almost always confounded metaphysical and empirical results. Monistic spiritualism is the view according to which the mind is a mental (geistige) substance, and the mental is the only reality; everything material, all movement in space, is but an outer form of a mental life. Through this last view *monistic* spiritualism is distinguished from the *dualistic* spiritualism introduced by Descartes. It is based on the impossibility of explaining the mental by the material, and on the fact partly overlooked, partly undervalued, by materialism, that our conception of matter is a mental product, and that, apart from our conception of it, we do not know what matter is. Thus the spiritual or mental is a *prius*, a pre-supposition, on which all thought rests; and a reasonable hypothesis is formed only by the reduction of the less known to the better known. The mental is properly the only thing fully intelligible to us, for in it we have not only a knowledge of outward circumstances and relations (*cognitio circa rem*), but a knowledge also of the thing itself (*cognitio rei*).

But even supposing all this to be true, it is not to the point. For if it be granted that everything is mental, and that nothing exists except thoughts and ideas, there still remains a distinction between ideas of material movement and ideas of phenomena of consciousness; and thus again arises the problem how these different sets of ideas, which have arisen in accordance with experience, are to be combined. In other words, the empirical problem is independent of the metaphysical. We do not here examine whether mind or matter is the most fundamental; we inquire in what way mental and material phenomena are connected in that experience, which every system of metaphysics consciously or unconsciously presupposes.

Hermann Lotze, the most distinguished representative of spiritualism in modern philosophy, has with great clearness emphasized the distinction between phenomenological (or occasionalistic, as he called it in his earlier writings) and metaphysical investigation. He did not, however, hold fast by this distinction, but on the contrary put it arbitrarily aside.

Lotze is one of the writers who in modern times have with the greatest energy defended the mechanical conception of organic phenomena, and have upheld the claims of the notion of mechanism to dominate our entire explanation of nature. It is the more noteworthy, that he struggles against the admission of the full consequence of the doctrine of the conservation of energy. "Physicists," he says in one of his earlier works (*Allg. Physiol.* p. 461) "appear to be convinced that every spatial-temporal movement of masses can be neutralised only by another similar and contrary movement, and hence has arisen the problem, to trace every movement, when once it has been started, through all changes of forms, to its final passage out of the organism into the external world, or to the point where it is destroyed by a contrary movement. I am not fully convinced of the perfect correctness of this fundamental doctrine; I know of no convincing reason supplied by the principles of natural philosophy, wherewith to confront *the possibility that spatial movements may be absorbed by passing into intensive states of the real.*" The point at which this passage from the spatial to the non-spatial world takes place is that at which, according to a later utterance (*Mikrokosmus*, 2nd ed. i. p. 326, Eng. trans. i. p. 290) we must look for the seat of the mind. In his later work (*Three Books of Metaphysics*), the last gift permitted to us from this able inquirer, he speaks more precisely as to his position with regard to the law of the persistence of energy. He lays emphasis on the fact that in itself this law expresses only an equivalence of the manifestations of force, promises only a *certain* compensation for energy that ceases to act, and says nothing as to what *kind* of energy this is. He thinks, therefore, it is not impossible to apply the law to a case in which a mental energy takes the place of a physical, or conversely. *Phenomenologically*, he thus places himself at the standpoint of the natural interaction, and in so far as he does so, his theory falls to the ground through the objections already urged against this doctrine. (See pp. 55–59.) But he does not remain at the phenomenological standpoint. The distinction between spiritual and material phenomena is for him only the starting-point; the spiritual —as he tries to prove by metaphysical arguments—is the only reality;

material phenomena are merely manifestations of the interaction of spiritual elements; and a transition from that spiritual essence which forms the foundation of material phenomena, to that spiritual essence which reveals itself in the phenomena of consciousness, offers no theoretical difficulties; the difference in kind, the want of a common measure, is got over by metaphysical reflection. Lotze's theory, like the Cartesian, is a doctrine of interaction, but supposes an interaction between spiritual substances; not, as with Decartes, between a spiritual and a material substance.

It is not easy to understand why at this point Lotze calls metaphysics to his aid if in the principle of the conservation of energy there is no obstacle to the doctrine of interaction. Here is an evident inconsistency in Lotze's theory, an inconsistency due to over-hasty interest in the defence of an idealistic conception of the universe. It is quite possible to agree with Lotze in his fundamental metaphysical thought, according to which the material is in its innermost essence of the same nature as that which stirs in our consciousness, without agreeing with him in his application of this fundamental thought to the theory of the relation between mind and body. That fundamental thought has so profound a philosophical significance that it may well be maintained without necessarily prejudicing the leading conceptions of experiential science.

(*d*) Only the fourth possibility, then seems to be left. If it is contrary to the doctrine of the conservation of physical energy to suppose a transition from the one province to the other, and if, nevertheless, the two provinces exist in our experience as distinct, then the two sets of phenomena must be unfolded simultaneously, each according to its laws; so that for every phenomenon in the world of consciousness there is a corresponding phenomenon in the world of matter, and conversely (so far as there is reason to suppose that conscious life is correlated with material phenomena). The parallels already drawn point directly to such a relation; it would be an amazing accident, if, while the characteristic marks repeated themselves in this way, there were not at the foundation an inner connection. Both the *parallelism* and the *proportionality* between the activity of consciousness and cerebral activity point to an *identity* at bottom. The difference which remains in spite of the points of agreement, compels us to suppose that one and the same principle has found its expression in a double form. We have no right to take mind and body for two beings or substances in reciprocal interaction. We are, on the contrary, impelled to conceive *the material interaction* between the elements composing the brain and nervous system, *as an outer form of the inner ideal unity of consciousness.* What we in our inner experience become conscious of as thought, feeling and resolution, is thus represented in the material world by certain material processes of the brain, which as such are subject to the law of the conservation of energy, although this law cannot be applied to the relation between cerebral and conscious processes. It is as though the same thing were said in two languages.

Experience alone can determine whether the two forms are co-extensive. We have already touched on the difficulty of finding the lower limit of consciousness; the next chapter will afford us an opportunity of taking up the question again. On the other hand, there are still some who hold that the noblest manifestations of mind are not linked to material processes. That sensuous perception, and so-called physical pleasure and pain, are linked with certain nervous processes, no one will dispute; it is only for higher phenomena of consciousness that it is thought necessary to adopt a completely new principle. But even the general account of consciousness already given, suffices to show the impossibility of drawing a boundary line between a lower and a higher. The same type prevails from the simplest to the highest forms. Far as the ideal world of thoughts and feelings appears exalted above the series of single, momentary sensations, it is yet the same principle which prevails in both; only the degree of development is different, not the plan of the structure or the material. The subsequent special psychological inquiries will bring this out more clearly.

As sharp limits cannot be drawn between a lower (sensuous) and a higher (spiritual) content, each with its own conditions of existence, so it is not permissible to regard the matter or content of consciousness as bound up with physical processes, while the formative and elaborating mental activity is supposed to have no physical parallels. While the individual sensations, in the opinion even of the strictest spiritualists, are connected with physiological processes, many think it is impossible to believe this of the activity whereby sensations are compared and judged. But, as will subsequently be shown, it is not possible to preserve a hard and fast line between what is given and its working up, between an absolute content and the relations which arise between the constituents of this content. Even in the simplest percept, at the very threshold of consciousness, we find the result of a mental activity, a combining of elements into unity, a synthesis. An absolutely simple state would not be conscious. At no point, then, can matter and form be separated. The physiological connection and interaction between the extraordinarily numerous brain-centres afford, moreover, ample ground for the belief that not only the mental elements, but also their combinations, have their physical expression.

In the mental as in the material world, we hold fast to the law of continuity. The *identity hypothesis* regards these worlds as two manifestations of one and the same being, both given in experience. The two languages, in which the same thought is here expressed, we are not able to trace back to a common original language. Moreover, so long as we keep strictly to experience, the one province is presented to us as a fragment, while the other extends to infinity in uninterrupted sequence. The doctrine of the conservation of energy makes the material world into a totality, which we indeed can never measure, but in which the fate of the individual forms and elements can be traced. The mental world has no corresponding law to exhibit. Mental elements come and go in experience, without our being able to point to an equivalent, which in the first instance would be used up, in the last would serve as compensation. The fact that mental states cannot be measured like physical energies and chemical substances, is in itself sufficient to frustrate the hope of our finding a mental parallel to the doctrine of the conservation of force. But in addition to this, even the fundamental conception of a mental existence puts difficulties in the way. Material existences can pass one into another, so that the energy lost in the one is preserved in the other. The doctrine of the conservation of energy shows us the unity and eternity of nature during the coming and going of all material beings. But mental existence, as has been seen, has for its fundamental form, memory, synthesis; and synthesis presupposes *individuality*. The material world shows us no real individualities; these are first known to the psychological standpoint, from which inner centres of memory, action, and endurance are discovered. If now we conceived of the individual mental elements (sensations, thoughts, feelings, etc.) as capable of being transposed to other combinations, like chemical atoms, it would follow that they might have an existence apart from a definite individual consciousness, a supposition which our account of consciousness shows to be absurd. Sensations, thoughts and feelings are mental activities, which cannot persist when the definite individual connection, in which they occur, has come to an end. They correspond to the organic functions, but not to the chemical elements. If the organism is resolved into its elements, organic function is impossible. The mental individuality has its physical expression in the sum of energy which the organism, in the germ and throughout its development, has at its disposal, and in the organic (especially the nervous) form in which this energy is applied.

The theory to which we are here led is not a complete solution of the problem of the relation between mind and body. It is only an empirical formula, an indication of the manner in which the relation presents itself provisionally, when, following the hint of experience, we take heed of the close connection between the mental and the material and the impossibility of a reduction of the one to the other, together with the difficulties attending the notion of a transition from the one to the other. Concerning the inner relation between mind and matter, we teach nothing; we suppose only that *one* being works in both. But what kind of being is this? Why has it a double form of manifestation, why does not one form suffice? These are questions which lie beyond the realm of our knowledge. Mind and matter appear to us as an irreducible duality, just as subject and object. We therefore postpone the consideration of the question. And this is not only justifiable but even necessary, since it is evident that the question lies in reality far deeper than is usually supposed.

It would be a misinterpretation of the identity-hypothesis to explain it as if it regarded the material as that which really exists, and the mental as a superfluous addition. The hypothesis, as here given, does not enter into the question whether mind or matter is the fundamental part of existence. It pronounces only that the same power which lives, expands, and takes form in the outer world of the material, also discloses itself in its inner world as thinking, feeling and willing. In asking after the inner connection between the physical and the mental worlds, we stand at the limit of our knowledge, and as yet no conception whatever has answered the question of the place of the mental life in the scheme of things, except by a teleological postulate, which it is not the business of psychology to investigate. So much only is certain, that if we are right in admitting this duality, there must be a reason for it. This is not the only instance in our experience, where we are obliged to accept a connection as given in fact, without being able to establish its necessity.

The empirical formula, with which we here end, does not exclude a more comprehensive metaphysical hypothesis. The fundamental notion of idealism, that the mental stands closest to the innermost essence of existence, may be very well combined with the empirical acceptance of the identity-hypothesis. As empirical formula, this says nothing as to the question whether the two forms of being are absolute or possess validity apart from the human point of view. Spinoza's doctrine that mind and matter are two equally eternal and infinite attributes of the absolute substance, was an over-hasty metaphysics. The absolute substance is not known by us, and we cannot therefore know whether mind and matter are equally essential to it. On the contrary, the theory of knowledge leads us to regard the phenomena of consciousness as the most fundamental facts in our experience, since, looked at logically, the subjective point of view is deeper than the objective. From this point of view the most natural conception is that which regards the mental life as the essential, and the corresponding cerebral activity as the form in which it is manifested to sensuous intuition. All the same, we have no right to maintain with monistic spiritualism, that spiritual existence expresses the innermost essence of being. There may be infinitely more forms of existence than the two which alone we know, and which, because they are the only two known to us, we are disposed to regard as the only forms possible.

It may therefore easily lead to misunderstandings, to describe the identity-hypothesis as "new Spinozism." It is, indeed, connected with Spinoza's name; it is to him that the honour is due of having first propounded the theory, and so advanced beyond the conflicting materialistic and spiritualistic theories. To this he was impelled by three different motives. In the first place he wished to remove all imperfect notions from the idea of the infinite essence; nothing besides this was to exist, nothing that was not penetrated by it; matter, therefore, could not be an external limit, but must be a special form of its manifestation. But besides this religio-philosophical or metaphysical motive, his conviction of the uninterrupted connection of the physical causal series also influenced him. If mental activity cannot interfere with this causal series, nothing remains but to suppose that the mental and material activities do not take the place of one another, but are carried on simultaneously (*simul natura*), especially as they cannot be reduced to a common measure. Spinoza anticipated the victorious march of the mechanical conception of nature; perceived that Galileo and Descartes had laid down principles under which the whole of material nature would have to be arranged. Finally, Spinoza based his theory on empirical grounds. Although for him as a speculative philosopher the question was doubtless settled on the two *a priori* grounds, still he thought that people "would scarcely consider the question calmly" if he did not adduce proofs from experience. He pointed, then, partly to the purposive way in which the body can act, even when consciousness is not present, as in instinctive movements and somnambulant states, partly to the proportionality between states of the mind and of the body, partly to the analogy between the psychological and the organic systems.[1]

The theory propounded by Spinoza has, under different forms, held its place in philosophy ever since his time. Leibniz maintained with Spinoza, that thoughts are to be explained by thoughts, movements by movements; only, on the basis of this parallelism, he undertook a more far-reaching reduction in the idealistic direction. Kant hinted at the identity-hypothesis in the first edition of the *Critique of Pure Reason*, although in the second edition he altered his earlier, more consistent conception in this as in other respects.[2] After the time of Kant it is found with more or less clearness and consistency in the speculative direction (Schelling, Hegel) as well as in the critical-empirical (Fries, Beneke). In Danish literature it makes its appearance with Treschow and F. C. Sibbern. And it is found in a whole series of philosophers and students of nature of the present day. More particularly Fechner must be mentioned, as the first[3] who based the theory of the relation between the mental and the material on consequences deduced from the principle of the conservation of energy.

Here this hypothesis interests us as the most natural determination of the relation between physiology and psychology. These two sciences deal with the same matter seen from two different sides, and there can no more be dispute between them, than between the observer of the convex and the observer of the concave side of a curve (to make use of a simile employed by Fechner). Every phenomenon of consciousness gives occasion for a twofold inquiry. Now the psychical, now the physical, side of the phenomenon is most accessible to us ; but this does not affect the principle of the relation of the two sides to one another.

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[1] *Cf.* my book, *Spinoza's Liv. og Läre* ("Spinoza's Life and Teaching"), (Copenhagen, 1877), pp. 89-100.

[2] *Cf. Kritik der reinen Vernunft* (Kehrbach's Ausgabe), pp. 206, 320, and 340, with p. 699. *Cf.* Vaihinger in *Strassburger Philosophische Studien*, p. 151 *seq.*

[3] *Elemente der Psychophysik*, 1860.

III

THE CONSCIOUS AND THE UNCONSCIOUS

In the preceding account of mental life, stress has been laid on two chief distinguishing traits—on the occurrence of a change, through which new elements of consciousness emerge, and on the connection between all elements of consciousness. If this account is correct, then consciousness may cease from two causes: either because the individual elements do not possess strength enough to make themselves felt, or because the connection between them ceases.

So long as we adhere strictly to the principle that the mind is known only through the manifestations of consciousness, the province of mental life is not widely extended. Nerve-processes are not all of the kind which we have reason to think accompanied by consciousness, and even those with which this is the case may be carried on without consciousness, if their intensity is not sufficiently great.

Thus a physical stimulus may take effect on the nervous system without a sensation arising; the sensation arises only when the stimulus has reached a certain strength. The nerve-process, on the other hand, must begin at lower degrees of stimulation, and has thus already reached a certain strength when the sensation crosses the threshold of consciousness. Let x, for example, denote the degree of strength of a nerve-process, which is just strong enough for a scarcely preceptible sensation, which we will call y, to correspond to it. We then have a peculiar relation: while the degrees of strength on the physical side continuously decrease from x downwards, the psychical side remains empty, stops suddenly at y. This is how the relation presents itself, whatever fundamental conception as to the relation between the mental and material we start from. It is the same with combination as with degree of strength; for there is only a difference of degree between the structure and mode of action of the lower and the structure and mode of action of the higher cells. Now is it probable that at a certain stage of the scale a something should arise which did not exist at all at the lower stages? If the series in the one sphere is continuous, must it not be supposed to be so in the other? We have no right to assume that there are chinks or gaps anywhere in nature; at any rate the advances of knowledge principally consist in the filling up and connecting of interstices and clefts.

The question before us is, whether the unconscious can be other than a purely negative conception. In daily speech (and, more than is proper, even in the scientific use of language) we use such expressions as unconscious sensations, unconscious ideas, unconscious feelings. As, however, sensations, ideas, and feelings are elements of consciousness, the expression is in reality absurd. If by an unconscious idea is meant an idea which I *have*, then the predicate "unconscious" signifies only, that I do not think of or pay heed to the fact that I have it. This use of the word unconsciousness is connected with a twofold use of the word consciousness. It is used to denote not only the inner presentation of our sensations, ideas, and feelings, but also self-consciousness, the attention expressly directed to our sensations, ideas, and feelings. We have, of course, many sensations and ideas without being conscious that we have them; many feelings and impulses stir within us, without our clearly apprehending their nature and direction. In this sense we can speak, for example, of unconscious love; a man who has this feeling does not know what is astir in him; perhaps others see it, or he himself gradually discovers it; but he *has* the feeling, his conscious life is determined in a particular way.

In desiring to examine here, however, the relation between the conscious and the unconscious, we understand by unconsciousness a state which lies below the threshold of our consciousness in general (not merely of our self-consciousness). We wish to examine whether it may not be shown that the unconscious is related to the conscious, and the difference on the psychical as well as on the physical side consequently one of degree only. But for the present we take it as a purely negative conception. It is not the intention to follow Edward v. Hartmann in the mystical paths which he believes he has opened up in his *Philosophie des Unbewussten* ("Philosophy of the Unconscious"). Hartmann not only without more ado makes the unconscious into a positive conception, but also uses it as an explanatory principle wherever he thinks that the physical and the psychological causal series fail. Psychology is on secure ground only when it confines itself to the clear and certain phenomena and laws of consciousness. But starting from this standpoint, it discovers the unconscious, and sees to its astonishment that psychological laws prevail beyond the province of conscious life. In what follows we shall adduce some examples to make this clear.[1]

2. Reference has repeatedly been made to memory as the typical phenomenon of consciousness. But memory presupposes change in the elements of consciousness. Now what becomes of the ideas that have disappeared, in the interval before their recall? In daily conversation the memory appears as a storehouse or treasure-chamber, where ideas are saved up for future use. It is only figuratively that actual existence can be in this way attributed to the ideas which have disappeared from consciousness. But the remarkable fact is, that it seems as if, nevertheless, they played a part in the actual activity of consciousness. If we want to recall something that is in our memory, and cannot come upon it, it is a well-known resource to leave off the search for it, and to think of quite different things; then the idea wanted may suddenly emerge. Here we give up the conscious search, and allow instead an absolutely unconscious process to begin. The case is similar when we have collected materials for some work, as *e.g.* the treatment of a scientific question. We are then often so overwhelmed by details, as to be unable to arrange and combine the matter. Here again occupation with quite different matters may be a good resource. In the midst of the new activity, the proper mode of treating the question may suddenly, as of its own accord, present itself to consciousness. Unconscious action has effected what conscious, direct, and strenuous work might never perhaps have succeeded in. Of course such results are never obtained in sleep; strenuous work is presupposed, the unconscious operation crowns the labour.

Some psychologists explain phenomena of this kind quite simply, by the greater freshness of the brain and mind, when a thing has been "slept upon." But this explanation can apply only to cases in which the question is directly taken up again after the break, not to those in which the abandoned subject suddenly, in the midst of occupation with other matters, presents itself to thought in a perfectly clear light. Here the subject has in the interval undergone further treatment, but this treatment has taken place below the threshold of consciousness; it has been carried on in us, not by us. And yet this unconscious working bears the impress of the same principles and laws that control conscious working.

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[1] In Carpenter, *Mental Physiology*, p. 515 *seq.*, there are a great number of examples. Some of those quoted in what follows above, are taken from this collection. Benecke in the first chapter of his *Psychologischen Skizzen* (Göttingen, 1827), has inquired with great acuteness into the relation between the conscious and the unconscious.

3. What is true in this way of many of our thoughts, is true also—as has been proved by the physiology of the senses—of our apparently simple and immediate sensations and percepts. We make for ourselves a continuous visual image, although in the retina there is a point (the blind spot) which receives no excitation. Many of our sensations of colour which we regard as immediate, are determined by the effect of contrast with other colours. The conception of space, which discloses itself to us *at one stroke*, has arisen by the combination of diverse impressions. Our two eyes have not the same range of vision, and yet we imagine that with both eyes we survey the binocular range of vision immediately. We judge the direction of the line of sight (according to Helmholtz) by the effort of will with which we try to alter the position of the eyes. But of all these combinations we are not conscious, and when it is said that our sensuous percepts are results of "unconscious inferences," it must be carefully noted that this expression is permissible only because we have no means of denoting these processes, known to us only by their results, except by expressions derived by analogy from the higher conscious life.[1] We employ here a sort of inverted anthropomorphism.

4. Not only may conscious results come from unconscious working up, but there may also be unconscious intermediate links in the midst of conscious work. Supposing the idea a to be linked with the idea b, and b again with c, then a will finally produce c directly, without the intervention of b. A proposition, which we have learned to understand by way of proof, remains in our consciousness after we have forgotten the proof. All education

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[1] Helmholtz, *Physiologische Optik*, p. 811. Afterwards Helmholtz avoided the use of this expression on account of the misuse made of it by Schopenhauer and Hartmann. But he still adheres to the position that we have here to do with an elementary process, which lies at the bottom of all thought properly so-called. "*Die Thatsachen in der Wahrnehmung*" (The Facts of Perception) (Berlin, 1873), p. 27 *seq.*

rests on the possibility of the intermediate links thus sinking below "the threshold." The authority of the educator is at first indispensable, but gradually falls into the background. The intermediate links are often so numerous, that they cannot be recovered at all, or only with great difficulty. Many psychological paradoxes and sudden suggestions have their explanation in this unconscious determining of conscious ideas.

5. Everything that we call instinct, tact, self-acquired or innate disposition operates in this way. Habits and tendencies which we have acquired or yielded to, or which are bequeathed to us from earlier generations, endure long after the causes of them have passed away. The ideas, feelings and actions, to which these tendencies lead, do not receive a complete explanation in the conscious life itself. There are always intermediate links which are passed over, and can be discovered only by physiological and sociological research. The conscious motives have passed away, but their effects remain. Instinct therefore has been defined as an acting for ends of which we are not conscious. Conscious effort is partially determined by unconscious motives, and leaves behind it unconscious effects. In the individual as in nations, sudden revolutions avail but little; below the surface tendencies persist, which it takes time to overcome. Thus it was necessary for the Israelites to wander forty years in the wilderness. Herodotus relates (iv. 3, 4) how the slaves of the Scythians, while their masters were away on distant expeditions, had married their women and secured supremacy. When the masters returned, they could not by force of arms subdue the young generation that had sprung from these marriages, but obtained their submission so soon as they cracked the whips which ordinarily served for the punishment of slaves. This narrative may serve at any rate as a poetical representation of the force of inherited habit.—In the lives of eminent and leading men, we often see how they have to struggle to overcome what the impressions of youth and habit have implanted.

Every mental revolution disturbs at first only that which stirs in clear consciousness; the unconscious undercurrents may long pursue their course, without being reached by the movement of the surface.[1] The reaction after a revolution often discloses how little real hold the movement has obtained. What has been consciously attained has not taken real root until it operates unconsciously or, as we say, has become part of the flesh and blood. Conscious work acts as pioneer; but it is also important that the unconscious machinery should be set in motion.—Conversely, we may practise something quite mechanically, which afterwards gradually gains control over consciousness. Forced conversion may lead to zealous faith, if not in the same generation, yet in later generations. Compulsion works against that of which there is clear consciousness; so that compulsory conversion succeeds only where no such consciousness is as yet developed. But mechanical exercise may gradually weaken consciousness. We are, according to Pascal's expression, automata as well as spirits, wherefore Pascal counsels us to begin with taking holy water and observing ceremonies; the rest will come of itself. This is his notorious principle: *Il faut s'abêtir.*

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[1] In H. Bröchner's treatise, *Om Udviklingsgangeni Filosofiens Historie* ("On the Course of Development in the History of Philosophy"). (Copenhagen, 1869), will be found many interesting indications of the way in which ideas may unconsciously influence their advocates; even their opponents, in the age which has produced them. See also his paper in *Nyt dansk Maanedsskrift* (New Danish Monthly, 1871), on the relation between the conscious and the unconscious.

6. An unconscious activity may be carried on simultaneously with a conscious. The spinner turns the wheel and draws out the thread, while all her thoughts are far away. A reader may be wholly absorbed in the contents of the book or even in other thoughts, while he sees the letters and pronounces the words corresponding to them. In these instances the subordinate action at any rate approximates to the unconscious, and there can be little question that the boundary-line may be crossed. And yet that which has thus taken place unconsciously, may afterwards assert itself in consciousness. Fechner relates (*Elemente der Psychophysik*, ii. p. 432), that one morning in bed he was surprised by having a white image of the stove-pipe, when he closed his eyes. As he lay with his eyes open and speculated, he had seen before him, without being conscious of it, a black stove-pipe with a white wall as background, and what now made its appearance was the negative after-image of this.[1] The physical excitation had thus been of such a nature, that the visual sensation *might have* arisen; but the attention being otherwise engaged, what appeared to consciousness was not the sensation itself, but only the more impressive after-image. In like manner, when we listen in a state of abstraction to some one speaking to us, we may not until long afterwards become conscious of what he has said. It is only by the express direction of attention that the impressions unconsciously received are here raised above "the

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[1] I have myself had an exactly similar experience.

threshold." That we are able to remember something is therefore no decisive proof that we consciously apprehended it at the time of its occurrence. By connection with that which has been consciously apprehended, even an unconscious impression may be called to memory.[1]

7. Unconscious impressions play an especially large part in the development of the feelings. Feeling is determined not only by clear and distinct sensations and ideas, but also by imperceptible influences, the sum of which only takes effect in consciousness. Hence the mystical and inexplicable character of so many feelings; especially when first excited are they incomprehensible even to the individual himself, since he does not know their definite causes. The vital feeling results from the effect of the organic functions on the brain; but the single impressions do not here stand out clearly, but combine to produce an obscure and changing background of well-being or discomfort. The feeling of love has, especially in its first dawning, a mystical character due to the arousing of uncomprehended organic instincts, and to the influence of these on the vital feeling and on the imagination. There is something of the sort even in other feelings, since we are never fully conscious of the influence of our experiences and the conditions of life on our state of feeling, until the feeling acquires a distinctly marked character or even perhaps breaks forth in actions. Such influences are like the air we breathe without thinking of it. They occasion within us a quiet growth which is often the most important and decisive factor in the mental life. This points us back to the general condition of conscious life and of nerve-process, that only a more or less sudden change arouses either to activity. A slowly increasing application of heat or of electricity may cause the death of a frog, without its ever stirring from the spot.

In the history of individuals and of the race, inner connection is preserved by means of this unconscious growth, which determines a great part of the content and of the energy of conscious life. It is only when attention is confined to the distinctly marked states of consciousness, that there appear to be sharp lines of demarcation and sudden revolutions; far below, infinitely ramified connections are discovered. So the coral-zoophytes build always below the surface of the sea, and what they build is not discovered until it rises above the sea-level.

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[1] Koch, *Vom Bewusstsein in Zuständen sogenannter Bewusstlosigkeit* ("Of Consciousness in States of so-called Unconsciousness"), (Stuttgart, 1877, p. 19): "There may be remembrance even of what was absolutely unconscious, as when, *e.g.* of a series of events, which did not come into consciousness, the last member joins on to a conscious state, and from it the whole series is raised by reproduction into consciousness; or when, in some later conscious state, the brain is disposed somewhat as it was in an unconscious state, and the correlated processes are then reproduced as conscious, as memory."

Leibniz was the first to call attention to the significance of the infinitesimal elements in psychology (as also in mathematics and physics). He brought this view into connection, moreover, with the law of continuity so energetically maintained by him. By means of unconscious impressions (which he called *petites perceptions*) he explained the connection of the single individual with the universe, a relation which is much closer than the individual is himself clearly conscious of; and he also employs them to explain the way in which the past determines, and is continued in, the future.[1]

8. In the state of dream we have an intermediate stage between the purely unconscious and the conscious state. The analogy exhibited between the dream-consciousness and the waking consciousness, may so far throw light on the relation between the conscious and the unconscious.

Sleeping and waking are usually contrasted as strict opposites. But just as in the waking state there are innumerable degrees of energy, clearness and connection of consciousness, so there are many shades of transition from waking to sleep, and conversely; and there are also different degrees of sleep. Thus the following descending stages in the scale of psychical energy have been distinguished: (1) Dreaming in a half-dozing state; (2) the light morning sleep with vivid dreams; (3) deep sleep with obscure, fluctuating dream-images; (4) the deepest sleep without dreams (?); and (5) a yet lower degree experienced in illness, the state of lethargy or fever-sleep.[2] The deepest sleep is that which we have immediately after falling asleep. The question whether we always have dreams, receives different answers. Those who believe this to be the case, appeal partly to metaphysical arguments—that the mind cannot from its nature refrain from activity; partly to physiological—that movements must go on continuously in the brain, and that impressions must be continuously received. It is at any rate clear, that dreaming is a step closer to waking life than dreamless sleep, if there be such a thing.[3]

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[1] *Opera Philosophica*, Ed. Erdmann, p. 197.

[2] P. Hedenius, "Om Drömen" (*Vetenskap för alla*), Bd III. pp. 609-611 (Stockholm 1880).

[3] [*Cf.* Sully (*Illusions*, pp. 132-134.) (Tr.)]

The connection of the dream-consciousness with the waking consciousness is shown, in the first place, by the fact that the dream-consciousness is frequently occupied with that which is the object of waking interest. Difficulties and annoyances, which were insuperable in a waking state, are overcome or thought to be overcome in dreams, while on the other hand familiar and simple situations present inconceivable and insuperable difficulties. In the next place, the elements of which the world of dreams is composed are for the most part derived from the experiences of waking life, though these are brought into new, often fantastic, combinations. During sleep, however, impressions are continuously received not only from within the organism (from the respiratory and digestive organs), but also from without (impressions of touch, sound, light, etc.). The connection with the external world is thus not entirely broken. Now, these impressions are interwoven with the after-effects of waking life, into a new world of images. But the formation of this new world takes place under conditions which differ from those of the waking state. There is lacking that firm concentration of attention and the universal control, which waking life calls out or imposes. Individual impressions, especially the organic sensations, obtain in consequence a power which thrusts unity and continuity aside. A free and bold interpretation of each individual impression is the result. Dreams acquire what has been appropriately called a mythological character. If the breathing is unusually easy and free, we think we are flying; if it is difficult, we are oppressed with nightmare. If the sleeper becomes cold through losing the bedclothes, he finds himself on a journey to the north pole or promenading the streets naked. A man who had a hot-water bottle at his feet dreamt he was walking on the crater of Mount Etna. Often a most complicated event is constructed to explain some quite simple impression, as when the falling of a curtain and the appearance of light in the room calls up a dream of the day of judgment depicted with a host of details[1]

In the waking state also we explain individual impressions according to their relation to our other experiences. The dream-consciousness follows the same method, often with great ingenuity and great perseverance, and with a certain artistic capacity; but it cannot as a rule keep individual impressions under control; each several impression sets up its special current of thought, which then takes possession of the entire consciousness, until it is dislodged by the next impression. There is not sufficient power of resistance against the individual elements. Hence the shifting and disorderly nature of dreams, resembling insanity, which is also a state of disorganization. It is possible even that many dream-images arise without being determined by sensuous impressions, quite automatically; but even to this there is something corresponding in waking states, namely in hallucinations and sudden suggestions.[1]

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[1] [*Cf.* Sully (*Illusions*, pp. 135-155.) (Tr.)]

The dream-state shows us, then, psychological laws in operation, but below the threshold of consciousness proper. It is a station on the road from unconscious to conscious life.

9. In the act of awaking there are sometimes circumstances which may throw light on the relation between the conscious and the unconscious. When we are awaked, it is not always the physical strength of the stimulus which determines the event, but its relation to the weal and woe of the individual, to his waking interests, what Burdach[2] has called the psychical relation of the stimulus. An indifferent word softly spoken does not rouse from sleep; but a mother will wake at her child's slightest movement. A very avaricious man was awakened by a coin being placed in his hand. A naval officer who slept in spite of a great tumult, awoke at the whispering of the word "signal." To conclude from such cases with Burdach, that the mind during sleep distinguishes sensuous percepts, is not admissible; on the contrary, they point to the view that an individual impression attains to consciousness only by connection with other experiences. It sets free a whole series of effects in the brain, and therewith consciousness is given. The act of awaking, which is transition from an at least relatively unconscious to a conscious state, is brought about by the individual impression obtaining, by combination with other impressions, the background it requires, in order to become conscious. It accords with this, that consciousness is apparently connected with very complex nerve-organs, in which many currents may meet together.

This circumstance may perhaps throw some light on a psychological paradox already mentioned—that a perfectly simple and unattached sensation cannot be conscious, and on the associated difficulty of representing the beginning of consciousness. This beginning might be thought of as having for its condition, that a single impression should at once call up several conscious elements. Just as it seems that what has taken place unconsciously can be remembered, so an impression might be able to arouse consciousness, by simultaneously freeing both fore-ground and back-ground. But this does not imply that the origin of consciousness can be thought of as a single, momentary act.

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[1] [*Cf.* Sully (*Illusions*, pp. 156-183.) (Tr.)]

[2] *Physiologie*, iii., p. 460. Carpenter also cites a number of examples (§§ 479-480).

10. Notwithstanding the intimate connection and close interaction between the conscious and the unconscious, the latter remains for us a negative conception. The unconscious processes are cerebral processes just as much as the conscious, but whether, like these, they are of several kinds, we do not know. Instead of speaking of unconscious thought or unconscious feeling, it would be safer—if we wish to avoid all hypotheses—to speak with Carpenter and John Stuart Mill of unconscious cerebration, were not this expression unsuitable, as suggesting, in the first place, the mistaken notion that there may be consciousness of cerebration, properly so called, and because, in the second place, it might appear to affirm that there is nothing at all in unconscious activity related to what we know in ourselves as conscious states. Just the impossibility of drawing a sharp line of demarcation between the conscious and the unconscious, together with the thoroughgoing analogy between their mode of action and their results, might perhaps justify an hypothesis upholding the law of continuity in the world of ideas, even as in the material world everything seems obedient to it. To all the different material phenomena of movement there would then correspond different degrees and forms of what in us appears as thought and feeling. As the organic world is built up of elements and by means of activities which make their appearance, though more scattered and without unity and harmony, in inorganic nature also, so in the sensations, feelings, and thoughts of conscious beings we should have higher forms of development of a something that, in a lower degree and in a lower form, exists in the lower stages of nature. We should escape from the paradox that conscious life begins without any previous preparation. Leibniz drew this very conclusion from the law of continuity: "Rien ne saurait naître tout d'un coup, la pensée non plus que le mouvement."[1] He instituted an analogy between the relation of kinetic energy to tension and the relation of the conscious to the unconscious. As

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[1] Op. phil. Ed. Erdmann, p. 226. *Cf.*, even earlier, Spinoza, Eth. ii., 13, Schol.

tension (potential energy) is living force in equilibrium, so might unconsciousness be consciousness at rest or neutralized. This would agree very well with the fact that change or destruction of equilibrium is so essential a condition of consciousness. As in the external world there is no such thing as absolute rest, so—it might then be said—there is no absolute unconsciousness. Unconsciousness would then not be a negation of consciousness, but would be a lower degree of it, the continuation backwards of the series of degrees of consciousness.[1]

Empirically, conscious life appears as united to certain forms or functions of the nervous system. But the nervous system has itself arisen by differentiation out of uniform protoplasm; the properties of the nervous system must likewise, therefore, be higher grades of something already correlated with general organic matter (*cf.* above, p. 35). There is nothing here to justify the introduction, at a certain given stage of material development, of wholly new points of view. The nervous system is, so to speak, only the highest flower of material existence; it is distinguished above other forms only by its higher degree of development. For this reason modern physiologists (*e.g.* Claude Bernard) trace sensibility back to the irritability (the power of receiving and responding to excitations) of organic matter. Conscious reaction would thus be only a higher form of unconscious reaction. Bernard finds evidence for this in the effect of stupefying drugs (anæsthetics). The power of such drugs (opium, chloroform, &c.) to suspend consciousness is due to the fact that they take effect first of all on that part of the organism which is most susceptible to excitations, and this is the nervous system, the most highly differentiated organic matter. But by the use of stronger doses, or by continuation of the effect, the remaining vital activity is also gradually affected. Now that which is influenced by one and the same thing in the same manner, only in different degrees, can be different only in degree. In this way we ascend gradually from the lowest manifestations of life to that highest vital activity, with which consciousness is linked.[1] The difference between human consciousness and the psychical element associated with the group of atoms, must be supposed to be as great as is the distance between the functions of the human brain and the movements of the inorganic group, though it may be one of degree only. Here, therefore, we are brought to recognize a continuation downwards of the scale previously given (I. 6). A difference of degree, however, does not exclude the possibility of the emergence of absolutely new forms and properties, to which we have no parallel in the lower stages; a body acquires, *e.g.*, other properties when its temperature is changed, and a compound substance may possess properties which belong to none of its constituents. We cannot, therefore, form any idea of the character of those forms of mental life which lie lower than what is to us the threshold of consciousness.

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[1] This view is held by various more modern writers. The most interesting development is that of Clifford (*Lectures and Essays*, ii., pp. 61-84 *seq.*). Virchow, who contested this hypothesis in his speech on "The Liberty of Science" (*Die Freiheit der Wissenschaft*), made nevertheless in regard to it the significant admission that, *if* the mental processes could be completely brought into connection with what takes place in the rest of the world, the province of mental phenomena would necessarily be extended far below the human consciousness—down to the lowest animals, to plants, cells, and atoms (p. 27). Monistic speculation cannot be called inadmissible, if it really is the only logical method of postulating connection between the mental phenomena and the rest of the world.

11. There still remains an important consideration. In what precedes, stress has been laid on the principle of the conservation of physical energy, a principle which expresses a grand coherence in the material world, but prevents the acceptance of a causal relation between matter and consciousness. But the principle of the conservation of energy is only the special, precise form which the general causal principle takes in the physical province. In this province the causal principle is satisfied, if physical causes have physical effects. But now consciousness makes its appearance as a plus which is added at certain points to these physical effects, as a something over and above, that cannot be explained by physical causes. Dubois Reymond, in his treatise *Uber die Grenzen des Naturerkennens* (1872), ("On the Limits to the Knowledge of Nature,") concludes from this, that mental phenomena stand outside the law of causality, and indicate a breach with the principle of sufficient reason. After all we have said, he must be allowed to be right, so long as we keep to a purely deductive standpoint and derive the premisses of the deduction from the principles of physical mechanics. But we have no right to regard these principles as the only ones. They are, as already pointed out (II. 2), the presuppositions on which it has been possible to erect the proud structure of the natural sciences; but it does not follow that they exhaust the nature of being. The same being, which,

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[1] Bernard, *Leçons sur les Phénomènes de la Vie*, pp. 280-290; see also his paper "La Sensibilité dans la Règne Animal et dans le Règne Végétal" (in the collection of Bernard's papers published under the title *La Science expérimentale*); as also his *Rapport sur les Progrès et la Marche de la Physiologie générale en France* (Paris, 1877), p. 180.

looked at from one side, may be apprehended and explained from points of view contained in the law of conservation and in the law of energy, may well have other sides, not to be explained from these points of view but involving new principles, though these cannot of course contradict the others. Now we have shown in the first chapter, that the principle that psychology is independent of natural science (in the narrower sense) is indicated by the fact that psychology is not merely based on the consequences of physics and physiology, but draws also from a totally different source of knowledge, namely, from inner subjective perception. If, then, experience is not exhausted in physical experience, we understand the necessity—after drawing the final consequences of the fundamental laws of physical experience, and finding that they do not lead to consciousness—of instituting a new inductive investigation, of apprehending a new empirical starting-point. Here two tasks present themselves, the one the discovery of a conformity to law in the psychological world of experience, the other the discovery of the relation in which the psychological experiences must stand to the physical. With the first we shall occupy ourselves in the subsequent chapters; the second we have treated in the preceding chapter. There it was seen to be difficult, if not impossible, to interpolate conscious life in interstices or gaps of external nature, and we were led to conceive of it as another form of manifestation of the same being that operates in the material world. Herewith Dubois Reymond's paradox falls to the ground. For there is now a possibility of supposing a connection as thoroughgoing in the one province as in the other. That consciousness seems to us to arise out of nothing is in that case only an illusion, precisely as it is a delusion to suppose that in external nature anything arises out of nothing. The apparent emergence of consciousness is then only a transition from one ideal form into another, just as every new material movement is produced by conversion from another form of movement.

Such an hypothesis must be taken at its proper value. The unconscious is a conception that marks a limit in science, and when we stand at such a limit, it may have its importance to try and measure, by way of hypothesis, the possibilities which suggest themselves as consequences of our knowledge; but any real extension of knowledge in this way is impossible. The psychologist acts here like the philologist, who supplements the fragment of an ancient author by critical conjecture. The mental world—as compared with the physical world—is to us as a fragment; it is possible to complete it only by means of hypothesis, and even such completion has great difficulties, which have already been touched upon (see p. 66 *seq.*).

12. This fragmentary character of the psychological phenomena, as known to us, makes it impossible for psychology ever to become an exact science, such as physics is already, and as physiology is in process of becoming.

The inner incompleteness of psychology is connected with the fact that we can propound no principle to which both our psychological and our physical knowledge can be traced back. Philosophical speculation has sought for some such principle, from which both the world of spirit and of matter might be deduced. Spinoza found it in "substance," the infinite original essence, Schelling in "the absolute identity," Hegel in the "absolute idea." But it has been proved of every principle of this kind, that it contains no real explanation, and that the deduction rests on unwarranted assumptions. Starting from experience, we are led to formulate such an aim, but perceive at the same time that it can never be attained.

But if we cannot at once reach an exact deductive psychology, to say nothing of a higher knowledge from which both psychology and physics might be deduced, we may establish by way of induction significant laws, which hold good in matter of fact for both conscious life and external nature. To Herbert Spencer belongs the credit of having first really worked from this point of view.[1] He has shown that all phenomena known in inner as well as in outer experience are subject to evolution, and has tried to lay down laws of evolution common to both. In all departments evolution consists in transition from an incoherent, indefinite, and homogeneous state to coherence, definiteness, heterogeneity.[2] By these common laws and forms mental life appears from a new side as closely bound up with the general life of the universe; with this its paths are interlaced. Here we will call special attention only to the fact that progressive individualization may be given as the common mark of evolution in all its forms. Everywhere in nature smaller totalities form themselves within the great, infinite totality, each with its particular relation of interaction with the surrounding world.[1] An individual is a being which is in such a way separated off from and independent of its surroundings, that it can re-act upon them with a certain uniqueness. But as already hinted (p. 35 *seq.*), the full stamp of individuality is found only in the province of conscious life, where central points are found for passion and action. This law of the universe receives therefore its clearest expression in the mental province, as a sort of compensation for the fact that the more elementary law of the conservation of energy cannot be established there. Could these two laws be brought into inner harmony or reduced to a yet deeper principle, all problems would be solved.

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[1] *First Principles* (1st ed., 1861); *Principles of Biology* (1864); *Principles of Psychology* (1st ed., 1855).

[2] See *Den engelske Filosofi i vor Tid* ("The English Philosophy of our Times"), pp. 137-139 (German edition, 1889, pp. 176-178). Among Danish writers, Sibbern has laid special weight on the fact, that all evolution takes place sporadically from different starting-points, and only by degrees leads to coherence, and he has shown this in respect of mental life very finely in a treatise in his *Philosophischen Archiv* (Kopenhagen, 1830), p. 263. [*Cf.* Dr. Ward's application of this principle of "progressive differentiation" to the theory of presentations (*Ency. Brit.* vol. xx. pp. 44 *seq.*, Art. "Psychology"). (Tr.)]

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[1] See my work *Uber die Grundlage der humanen Ethik* ("On the Basis of Humane Ethics") (Bonn, 1880), pp. 80-81.

IV

CLASSIFICATION OF THE PSYCHOLOGICAL ELEMENTS

1. The preceding chapters have been occupied with the relation of psychological phenomena to other departments. Before we enter into an investigation of special psychological relations, it will be profitable to glance at conscious life as a whole and at the chief differences found in it. We shall thus be less exposed to the danger of losing sight of the whole for the details. It is true that, as in the previous chapters we have made use of psychological developments and results, so here we shall have to take as given and allowed much that can be proved only by special investigation. We shall gain, however, this advantage, that the exposition may proceed from the more to the less obvious, and from the main features to the details. To which may be added, that special psychological investigations presuppose an abstraction from that great vital connection, in which every mental fact has its existence; so that it is the more necessary to gain first of all a firm grasp of that whole out of which psychological abstraction isolates single elements.

The abstract character of psychological distinctions and conceptions has not always been clearly seen. Reflection discovered at a very early stage different elements in conscious states, but was disposed to establish them as independent, separate parts or faculties of the mind (*cf.* I. 8, *c*). Thus even in Plato (*Republic*, *Bk. IV.*) we find a distinction, based on a penetrating analysis, between different "parts" of the mind, in which inner contending principles are exhibited: (1) Reason; (2) Feelings of courage and anger; (3) Sensuous impulse. In modern times different "faculties" have been spoken of in the same external manner, as acting independently of, and in opposition to, one another. Not only was a division between different parts or faculties thus introduced—a division disproved by the thoroughgoing unity of conscious life, without which even the strongest contrasts could not be felt or apprehended—but moreover those who took this view fell into the delusion of supposing that by tracing the phenomena back to different "faculties" they had reached an explanation: that, *e.g.*, knowledge and feeling would severally be more easily intelligible, if a special faculty of knowledge and a special faculty of feeling were accepted. This illusion was similar to that which derived life from a vital force—a notion ridiculed by Molière in the last interlude of *Le Malade Imaginaire*, when he makes the candidate for a medical degree explain the soporific effect of opium by attributing to opium a *virtus dormitiva.* The purely abstract character of such distinctions was overlooked—as in popular usage it is still overlooked. They imply only that there are certain differences between certain states of consciousness. But it does not follow that there is any justification for arranging the various states each in its own class. It must first be inquired whether there are not the same elements in all actual states of consciousness, the differences arising from the preponderance of certain elements and the subordinate importance of others. Properly speaking, then, it is not the phenomena of consciousness or the states of consciousness themselves which are grouped and classified, but the elements which on closer examination we find in them, since by psychological elements we understand the different sides or qualities of the states or the phenomena of consciousness. When intellection and feeling are contrasted with one another, all that can be meant is the contrast between states with preponderating ideational-elements, and states with preponderating feeling-elements. It will be seen that this view is the only one tenable, since no state can be pointed out, which is absolutely pure idea, or feeling, or will. The question as to classification, then, is really this—whether we are justified in admitting different species of psychological elements.

2. The classification now generally accepted is the tripartite division, into cognition, feeling, and will. After the bipartite division into cognition and will had been followed from the time of Aristotle, the German psychologists of the last century accepted feeling as an intermediate link. Rousseau obtained special in-

fluence on psychological classification by impressively maintaining the rights and the importance of the life of feeling. Kant's application of this tripartite division secured for it universal acceptance. The attompts which have been made since Kant to trace back all manifestations of consciousness to a single species of element, have not been successful, and besides, these really recognize the three kinds as given, and only endeavour to trace them back to one principle.

The older psychologists conceived feeling either as obscure thought, or as impulse and will. It was natural that attention should first be directed to cognition and will, and should overlook the elements which lie deeper. This is analogous to the fact that attention is directed outwards to the external world earlier than to the internal. Cognition and will denote in fact the sides of conscious life which are turned to the outer world. In cognition (under which psychology reckons sensations, representations, and thoughts) an image is formed of the external world and of the individual himself as a part of the world. In will (under which are reckoned impulse, purpose, and resolve) the individual reacts on the outer world. The elements of feeling, the inner rhythm of pleasure and pain, are always so closely bound up with certain images and thoughts or with certain actions, that they may easily be confounded with them. Besides, the element of feeling is in itself difficult to describe. A simple sensuous percept, *e.g.*, a colour or a sound, can be more directly indicated; but feelings of pleasure and pain lie deeper, and cannot be elements of immediate sensuous perception. Feeling might perhaps be defined as that in our inward states, which cannot by any possibility become an element of a percept or of an image. It is an inner illumination which falls on the stream of sensations and ideas. Nor is it every pleasure and pain which finds expression in action. In the first chapter we have given instances of the difficulty of arguing from external relation to inner feelings.

The independence of the feeling-elements as contrasted with other conscious elements is apparent in the fact that even if there be no state that can be called mere feeling without cognition and will, yet feeling does not necessarily accompany any definite condition, theoretical or practical. In different individuals and in the same individual at different times, pleasure and pain accompany different objects. Something which at first excites pain, may afterwards excite pleasure, and *vice versâ*. At the same time there is a clear contrast between states in which thought or action so powerfully occupies consciousness that the wave of feeling is scarcely perceptible, and states in which the powerful stirring up of feeling suppresses clear and coherent thought and circumspect action. Physiologically, the latter states are clearly indicated by the transmission of movement from the central nervous system to the internal organs, and by the reaction of these upon the brain.

3. Although we are thus justified in employing the tripartite division as a basis in psychological inquiries, it does not follow that it is to be regarded as original. In presenting the characteristics of conscious life, we take it as it appears at an advanced stage of development, where it has acquired a certain distinctly marked form. There is no ground for supposing that the threefold nature of the elements is equally prominent at lower stages of development. On the contrary, it is one of the general laws of development that the indefinite and the homogeneous precedes the definite and heterogeneous. The first germ of the organism is a uniform mass, in which no definite structure can be distingished. If conscious life follows the general laws of life and of development, then the three different species of elements must not be expected to stand out so clearly at the lowest as at the later stages.

This suggests the introduction of a second point of view. Instead of a classification according to breadth, according to the dissimilar but simultaneous elements, we now obtain a classification according to height, according to the stages of development. A point of view of this kind was introduced at an early period in psychology, and once more Aristotle, the founder of experiential psychology, must first be named. Plato, indeed, distinguished between higher and lower forms of mental life; but he was mainly influenced by ethical motives, and denied that the higher mental forms could be evolved from the lower, since the latter arose only through the implanting of a spiritual being in a mortal body. Aristotle, on the other hand, tries, with a penetrating use of the materials at his disposal, to show how one form of the mental manifestations forms the basis of another. In our times this conception has received fresh support through the evolution-hypothesis, and through the inducement this offers to find the connection between the stages of development of mental life not only in the individual but also in the race and in successive generations.

4. Conscious life certainly begins in the fœtus-state (see I. 4). So far as it is possible to judge, various more or less definite sensations (consequently cognitive elements) must be experienced even in this state. In like manner there are certainly oscillations of pleasure and pain, following the course of the vegetative functions. In the movements, often very lively, which the fœtus makes, may be recognized the expression of a primitive will, whether we explain them (with Bain) by an unconscious impulse to the discharge of accumulated tension, or even here talk of an actual impulse to movement. Even if these movements take place at first quite unconsciously, they will soon bring about consciousness through the sensations which they occasion. Here, then, are elements of all three kinds, but in close conjunction. The transition from stimulus to reaction is here immediate; even if the movements of the fœtus are something more than mere reflex-movements, they do not rise far above the stage of instinct. *Instinct* is distinguished from mere reflex-movement by the fact that it includes an obscure impulse of feeling, consequently a sort of consciousness, though not consciousness of the actual end of the action; it is distinguished from the involuntary discharge of energy, supposed by Bain, by the fact that it is directed to a definite end, useful either to the individual or to the race. Instinct need not be displayed at one stroke; it does not exclude the necessity of certain elementary experiences; but these are easily and naturally obtained by means of the original organization. The movements in which the sense of well-being or of discomfort finds expression, must naturally take that course which the organization of the individual renders most accessible. This original organization is a given starting-point, connecting the conscious and the unconscious, the heritage of the race and the experience and activity of the individual. The new-born individual is thus not only in possession of sensory and motor organs, but had already begun, in the maternal bosom, to exercise them.[1] A definite discrimination of the different elements cannot, however, be made at this stage. Sensations blend immediately with feelings of pleasure and pain, and these break out, equally immediately, into movements.

The experiences of early childhood correspond to what may be concluded about the conscious life of the fœtus. The predominating importance of the vegetative life precludes differentiation. Immediate, instantaneous transition from excitation to movement is characteristic of the earliest stage of conscious life; it is only gradually that an interval is formed, in which inner differences and contrasts may make themselves felt. "The absolute strength of the assimilation of brain-substance is considerably greater in the child than in the adult. The greater content of water, and the decidedly softer constitution of the brain-substance, likewise favour assimilation, the preponderance of which may in some measure account for the greater excitability of a child's nervous system." Where adults merely tremble, children fall into convulsions. The purely involuntary and instantaneous character of the transition from stimulus to movement is especially manifest from the small importance of the cerebrum in the earliest period of life. Its removal or disease has not the same consequences for infants as for older persons.[1] If the connection between the functions of the cerebrum and the higher activities of consciousness is considered, the psychological significance of these facts will be realised.

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[1] Kussmaul, *Untersuchungen über das Seelenleben des neugeborenen Menschen*, p. 35; *cf.* Cabanis, *Rapport du Physique et du Moral*, éd. Peisse, Paris, 1843, p. 114, *seq.* Burdach, *Physiologie als Erfahrungswissenschaft*, Leipzig, 1828, vol. ii. p. 693, *seq.*

Even where there is not only instinct, but also *impulse* in the narrower sense, namely, as a motor-impulse directed by an idea of the end, the relations are still too simple for the difference in the psychological elements to be clearly and definitely apparent. The idea plays in impulse only the part of disposing the mind to move in a certain direction, as the idea of water in a thirsty person. Now to the painter who thinks of the play of light on the surface of water, or to the chemist who thinks of its composition, the idea of water is to a certain extent separated off from the rest of the conscious state, and has become in some measure independent of it.

Just as consciousness is slowly evolved out of vegetative life, so is it, through the infirmities of old age, the gradual approach of death, and in advanced mental disease, again resolved into it. The highest, most differentiated phenomena of consciousness are the first to give way; impulse, instinct, and reflex movements become again predominant. The phrase "to grow childish" expresses the resemblance between the first stage and the stage of dissolution.

Thus consciousness describes a curve from the fœtus state to death. The two points in which this curve terminates are comparatively simple states, but little differentiated or articulate. Only in the middle and on the highest point do ideas, feelings and expressions of will come into effect in their specific character.

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[1] Vierordt, *Physiologie des Kindesalters*, pp. 133—137; Darwin, *The Expression of the Emotions*, London, 1872, p. 67 (2nd edition 1890, p. 70).

5. What in this way applies to the development of the individual, is valid also for that of the race. A definite distinction between intellection, feeling and will presupposes a stage of civilization where perpetual and instantaneous reaction upon the external world is not required. Directly or indirectly the whole conscious life is determined by the position of the individual in the universe, and by his need to make acquaintance with his surroundings and either bring them into harmony with him, or himself with them. Even in the thoughts and feelings apparently most independent of practical considerations, practical motives of this kind may be traced. But it is a condition of any independent development of the life of thought and feeling, that the elementary practical requirements of life should be satisfied. Science and art, which are the forms taken by this life of thought and feeling when it is emancipated from immediate practical motives, do not develop during a state of general warfare. Nor are the shady sides and degenerate features of psychological differentiation, such phenomena as morbidness and sentimentality, possible under these conditions. Where life is an immediate struggle for existence, thought does not become isolated from feeling, nor feeling from will. Threatening dangers and hoped-for benefits fully engage consciousness, and set the will immediately in motion. The content of thought is that which impulse (Schopenhauer's *Wille zum Leben*) demands, and feeling is one with desire.

6. The forming of an interval between affection and reaction presupposes adequate energy as well as an adequate organization and adequate time.—There must be sufficient *energy* to resist the impression; its immediate influence must be checked, that more extensive inner activities may be called out and developed. And these inner processes lay claim to an energy which would otherwise be at the immediate disposal of the re-acting activity. Starting from the supposition that a conscious being at every stage of development has at its disposal a certain sum of energy, the limits of which are also the limits of the individual (so far as intensity is concerned), it is clear that this sum must be greater if it has to be divided among different complicated functions, than if it is employed in the execution of a single simple function. If this energy does not augment with increasing differentiation, the latter leads to a

weakening or to a morbid one-sidedness of conscious life.—That these inner activities presuppose a richer *organization*, needs no special proof. Even if no thoroughgoing localization of the various psychological elements is admitted, it is yet probable that the cerebral processes are the more complex, the greater the advance in psychological differentiation.—In like manner it is clear that longer *time* is required for the reaction to take place, if several different activities are called into play. A certain independence of the requirements of the moment is therefore, as already observed, a condition of higher mental development. A simple and clear proof of this is given in the investigations into *physiological time*, *i.e.* the time which elapses before a stimulus is perceived and responded to. Even reflex movement takes more time than mere transmission along a nerve fibre; the difference (the so-called reflex time) is about one-twentieth of a second. Still greater is the difference between a voluntary movement and the contraction of a muscle due to the direct stimulation of the motor-nerve; experiments made with the forefinger of the right hand gave the difference as 0·13 of a second. Stimulation of the grey substance of the cerebrum, in the region where the motor-centres are located, takes 0·015 of a second longer to arrive at the muscle, than stimulation of the immediately underlying white substance. The stronger and more distinct the excitation, and the more natural or practised the voluntary movement which it calls forth, the shorter is the physiological time (or, as it is also called, the re-action time), and the nearer the approach to the sureness and quickness of reflex movement and of instinct. The more the individual is prepared for the nature and strength of the excitation and for the movement by which it is to be answered, the quicker will the re-action take place. Even with doubt as to which of two possible excitations will be given, physiological time increases; there is then interpolated a "discrimination-time", which is spent in determining the nature of the excitation. And if at the same time each of the possible stimuli is to be answered by a special movement, so that the movement to be made has first to be decided, then a special "will-time" is required.[1]

7. It must not be forgotten that differentiation implies only

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[1] Exner, *Physiologie der Grosshirnrinde* (Hermann ii., 2), pp. 278-281.—Panum, *Nervevärets Fysiologi* ("Physiology of the Nervous Tissue"), pp. 115-207.—Wundt, *Physiol. Psychologie*, i., p. 259, ii., p. 206-279 (3rd edition, i. p. 277, ii. pp. 263-330.) And yet, according to later experiments (Cattell, *Psychometrische Untersuchungen*, Wundt's Studien iii., p. 472) physiological time is not extended in the more complicated transactions as much as might be expected.

preponderance of different elements in different states, not their complete separation.

a. In spite of all independence of practical need and of the wants of the moment, thought is always accompanied by a certain mood. Elements of feeling are present, and are overlooked so easily only when, instead of coming to the front, they subordinate themselves to the play of thought and are determined by it. An activity of thought entirely free from feeling (as so often postulated by speculative philosophy) does not exist. It is because of the movements of feeling accompanying all ideas and thoughts, that knowledge becomes a power in the mind. When the conflict of reason with passion is talked of, what is really meant is a conflict between the feelings accompanying reasonable considerations and the more violent feelings associated with fewer elements of thought, which are denoted by the expression passion. A feeling may be very strong and deeply rooted without being violent, but is then more easily overlooked. The feelings accompanying ideal aims and relations are far less in a position to produce momentary effects and sudden ebullitions than are the primitive feelings, accompanying the physical vital functions. In the passions associated with self-preservation and the propagation of the race there lies an animal ardour, which is often beyond the control of all other influence. Ideal feelings are spread over a longer space of time, and take effect more secretly. And yet they are capable of possessing themselves step by step of the central position in the mind, and of employing in their service the accumulated energy originally under the control of those primitive impulses.

b. Just as little is cognition ever completely emancipated from will. In all memory and synthesis there is manifested an activity, of which we become specially conscious and which we call attention, when for internal or external reasons it is brought strongly into play, but which in reality plays a part even in the simplest sensuous perception. We must *will* to see, in order to see aright. But it is true of this effort, as of the stirrings of feeling, that unless raised by opposition or in some other way to a higher degree of strength, it is as a rule overlooked. This element of activity in all intellection has been dwelt upon chiefly in modern psychology, at first especially as a reaction against the attempts of Condillac and of the one-sided "association psychology" to reduce all knowledge to mechanical interaction between purely passive sensations and their after-effects.

c. While for a long time there was a disposition, overcome only through the influence of Rousseau on modern thought, to overestimate intellection at the expense of feeling, attempts have since been made, and especially in later times, to conceive feeling as the primitive form of consciousness, so that conscious life at its lowest stage would be a life of pure feeling, and the other elements would only gradually develop out of it. Such attempts are explicable partly from the close connection of the life of feeling with the conditions of existence, while the cognitive elements seem to move rather in the periphery of our being; partly and principally from the fact that the feeling elements are found more distinctly and strongly, and play a much greater part as compared with the cognitive elements, the farther we descend from the higher to the more primitive forms of consciousness. But this view is at once proved untenable by the fact that memory is concerned so soon as a state of pleasure or pain persists—and it must persist in order to be really felt;[1] and so soon as a pulsation takes place—the intensity of states of feeling is always subject to oscillations—there will at once be involuntary comparison. Here, then, already are elements of cognition which may serve as the starting-point of a further development, so that cognition does not arise by a sort of *generatio æquivoca* out of mere formless and blind states of feeling.

A conception of this kind was formulated not long ago by Ad. Horwicz.[2] According to this writer's very interesting exposition, the movement stirred up by feeling clears the path for cognition. Pleasure and pain lead to certain movements, which are tested until the most suitable is found; this is then practised and so obtains a special mark, by means of which it is made an object of consciousness.—But then there is something else besides the element of feeling, the motor-sensation namely; and there is no ground for supposing that this latter is always derivative, for involuntary movement makes an appearance as early as consciousness itself. In primitive consciousness there are, then, probably not only the feelings of pleasure and pain, but also motor-sensations. (I. 4, and IV. 4.)

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[1] Patients under chloroform often utter cries during the operation, without being able on awaking to remember that they had felt pain. "A vrai dire," says Richet in this connection, "cette douleur si rapide qu'on n'en conserve pas de souvenir, n'est rien, et c'est un moment presque mathématique dont il n'y a guère à tenir compte. Ce qui fait la cruauté de la douleur, c'est moins la douleur elle-même, si intense qu'elle soit, que le retentissement pénible qu'elle laisse après elle."—*Recherches sur la Sensibilite*, p. 256. Maudsley considers that these cries of pain are purely reflex. He quotes a case of a lady, who had her breast amputated, and who remembered on waking that she had heard herself shriek, although she declared she had felt no pain (*Mental Physiology*, p. 209).

[2] *Psychologische Analysen auf physiologischer Grundlage* ("Psychological Analyses on a Physiological Basis,") i., Halle, 1872, p. 350, *seq.* [For criticism of this view see *Ency. Brit.* vol. xx. Art. "Psychology," p. 40. (Tr.].

Even in the monera, the lowest forms of animal life, expansive and contractile movements have been found; the former serve to take in food, the latter as a protection against attack. Even at this stage it seems necessary to suppose elements in consciousness other than mere feelings of pleasure and pain, namely, sensation of touch and movement, and perhaps sensations arising from chemical stimulation, something analogous to sensations of taste. "In the search made by the creatures (*i.e.* the protozoa) for food, it is plainly seen that they are capable of making certain distinctions, a capacity without which touch would have no object, could scarcely be called touch. Hand in hand with locomotion in search of food goes of necessity the formation of a discrimination among different directions, *i.e.*, a discrimination of the pleasant direction (that in which the object of food is found) from the relatively less pleasant; and this distinction once present, the direction whence danger comes is readily discriminated from the contrary one."[1] Although it might be supposed that the sensations experienced by these slightly developed beings, in whom no nervous system has yet been detected, could have no clearness and distinctness, yet the facts mentioned show that the creatures must be able to apprehend a difference between the stimuli. Pleasure and pain, moreover, would be of very little service to them if they were impelled thereby to execute movements, without being able to determine more closely from the character of the stimulus the kind and direction of the movement.

In higher and fully developed animals also there is an approximation to a state of pure feeling, namely, in the vital or general feeling—the fundamental frame of mind which results from the general state of the organism, from the normal or abnormal course of the vital processes, in particular of the vegetative functions. It is but rarely and imperfectly possible to localize the stimuli which produce this feeling. They do not make their appearance separately, or with the special qualitative character of the stimuli received through the senses. Even differences of degree are not so readily apprehended here as in the special senses. The vital feeling consists in an obscure mood, of the cause of which we are not, at any rate not at once, conscious. Diseases of the heart and of the mind may cause disquiet and melancholy, without the sufferer discovering the causes of these frames of mind. In the years of puberty there is aroused with the growth of the sexual organs a vague desire and longing, an obscure impulse, that, in a way incomprehensible to the individual, takes him out of himself. The temperament is especially shown in the fundamental mood which prevails in the vital feeling.—Few as are the cognitive elements which can be indicated in these states, they yet stand out, each with such a special character, that the transition from the one to the other, together with the difference between them, must be more or less plainly felt in consciousness, and they can none of them be as simple as a state of pure feeling must needs be.

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[1] G. H. Schneider, *Zur Entwickelung der Willensäusserungen im Tierreich* ("On the Development of the Expressions of Will in the Animal Kingdom" (*Vierteljahrsschrift für wissenschaftliche Philosophie*, 3. Jahrg.), pp. 183, 301. *Cf.* Romanes, *Mental Evolution in Animals*, London, 1883, p. 55, *seq.*, 80, *seq.*

That the higher feelings contain cognitive elements requires no further proof. Feeling acquires a content or an object only when it is linked with memories and thoughts.

Self-observation reveals at most only an approximation to a state in which all cognitive elements have vanished. Such an approximation is reached, the more the strength of the feeling element increases. Cognition and feeling must thus stand in inverse relation to one another; the more strongly the one is manifested, the less the strength at the command of the other. An overwhelming joy or sorrow may drive out almost all ideation, all recollection; but an ecstatic condition of this kind stands on the margin of consciousness.

d. The close relation between feeling and will appears from the fact that only a strong and lively feeling serves as a motive to the will. Cognitive elements do not in themselves lead to voluntary movement. Sibbern calls attention to the fact that feeling and will have this in common, that in both "the ideas involved have a personal hold and effect, so that we yield ourselves up to them and are incited to act and strive for their realisation."[1] The close connection with movement is common to both. Movements caused by feeling are, indeed, in part such as are beyond the direct control of the will, and arise from the propagation of the strong movement of the brain to larger or smaller regions of the organism. Heart and lungs, alimentary canal, vascular system and other internal organs, show in this way traces of the effect of emotion. But also organs and muscles which are usually under the control of the will, may be set in motion by strong feeling, and it may be difficult, if not impossible, to distinguish between emotional and voluntary movement. Feeling finds a natural vent through those movements which have been frequently (in the same individual and in earlier generations) employed in the service of the will. Even monads execute movements of contraction and shrinking to protect themselves from enemies; and when the same contraction and shrinking is found in beings on a higher level as a consequence of sudden fear, it is probable that this is an old instinct still obscurely stirring in the expression of the emotions. The Greek word φόβος, fear originally signified (as frequently in Homer) flight. Similarly anger finds a vent in movements of attack, strong sympathy in extending the arms, as though to embrace the object, etc. According to the evolution-hypothesis, these phenomena find their natural explanation in the fact that the involuntary emotional movements were originally purposive voluntary movements.[1]

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[1] *Psychologie*, Copenhagen, 1856, p. 150, *seq.*

It is only in the course of psychological development that differentiation between feeling and will makes its appearance. There comes to be an ever greater contrast between the two ways in which inner movement finds a vent. The psychological importance of the law of persistence of energy is here seen plainly. For the more energy an individual expends on the one kind of reaction, the less can he expend on the other. This truth is strikingly illustrated in Saxo's well-known tale of the different effect which the news of the murder of Regner Lodbrog produced on his sons: he in whom the emotion was weakest had the greatest energy for action.

Feeling, like cognition, has at first a distinctly practical character. It is only after a long period of development that feeling is severed from practical impulse and can move freely (as in æsthetic and religious dispositions) without direct regard to outward action.

e. If any one of the three species of conscious elements is to be regarded as the original form of consciousness, it must evidently be the will. In the instinct but slightly raised above reflex movement, is given the primitive form of consciousness, and in this the element of will is evidently the strongest; the intellectual and emotional elements acquire significance only as links in the chain that leads to action. Afterwards, too, the will forms at all stages the constant basis. Activity is a fundamental property of conscious life, since always a force must be presupposed, which holds together the manifold elements of consciousness and unites them into the content of one and the same consciousness (III. 5). Independently of this, the most fundamental form of the will, the word will is used in two different senses, a narrower and a wider. In the narrower sense, as the power of choosing between different possibilities, the will is only the product of a mental development, not an original factor. But if will is understood in the wider sense, as all activity determined by feeling and cognition, it may be said that the whole conscious life is gathered up in the will as its fullest expression. Although conscious life reaches a higher development only by the inhibition of the involuntary impulse to movement, still the transition to movement is always the final step of all that takes place in the world of consciousness. The development of the conscious individual proceeds from will (in the wider sense) to will (in the narrower sense). This development may be very sporadic, may progress one-sidedly and by way of oppositions ; but there will always be present (if not in the individual, in the race) an obscure impulse leading beyond what is scattered, one-sided, and conflicting, to an inner harmony of the deepest mental currents. Ethics and æsthetics are quite right when they recognise in such a harmony the highest type of human life.

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[1] Darwin, *The Expression of the Emotions*, chap. i.; Spencer, *Principles of Psychology*, ii., p. 545, *seq.*; Wundt, *Physiologische Psychologie*, ii., p. 417 (3rd ed., ii., p. 510, *seq.*).

V

THE PSYCHOLOGY OF COGNITION

A. Sensation

1. IN considering the cognitive elements apart from other phenomena, we make, as we saw in the last chapter, an abstraction, since in every actually experienced state of consciousness elements of feeling and will are undoubtedly present also. Such an abstraction is, however, necessary; in every scientific inquiry the subject-matter must be to some extent withdrawn from its complex conditions. And this abstraction must be carried yet farther, for the cognitive elements are themselves in a high degree complex. They can, it is true, be roughly divided into two groups, into sensuous perception and thought, but, as will be seen, these two groups are not distinct, but most closely connected. Consciousness—at any rate in the forms in which we know it at first hand—never makes its appearance as a perfectly simple series. Numerous series of thoughts and memories, sensations and ideas, interlock in every individual experience, every individual judgment. But in order to get a clear view of relations and laws, we must, so far as possible, think of consciousness as forming a simple series. And not only so; we must begin by thinking of this series as composed of sensations only. The distinction between sensuous perception and thought rests upon the distinction between sensations and representations; between the new elements immediately given and the residues or after-effects of these elements, which re-emerge. So soon as elements acquired at an earlier stage are concerned in the apprehension of new elements, there is no longer pure sensation; a certain amount of thought is then com-

bined with the sensuous perception. And further, if we disregard this, and endeavour to conceive a consciousness which shall consist of nothing but sensations, there still remains the question whether even these are perfectly simple and independent of one another, or whether there is not constant combination and interaction between them.

It is evident that the provisional account of consciousness given in an earlier chapter (II. 5) cannot be correct, if sensations are perfectly simple and independent. In that account we found the characteristic feature of consciousness to be the fact that it makes its appearance in a series of elements not mutually independent, but on the contrary essentially conditioning one another, a close interaction which had its most typical expression in memory. The correctness of this account must now be to some extent tested.

2. By purely psychological observation the *simplicity* of our sensations can be ascertained only to a certain degree. We can never be quite certain that we have before us something unanalysable. At the point where introspective psychology breaks off, the experimental physiology of the senses takes up the thread, and has in some instances established that the apparently simple psychological phenomenon involves an intricate and complex physiological process. The possibility cannot therefore be excluded, that the psychological simplicity may be merely the result of previous combination below or at the threshold of consciousness.

Organic or general sensations are, as a rule, of a manifold, chaotic character, a fact connected with their obscure and only slightly articulate nature. Stimuli from the organs of respiration, circulation, and digestion operate in conjunction without separately attaining to consciousness. Such a sensation as, *e.g.*, nausea, has something complex about it even to immediate perception, as may be seen from the fact that some have proposed to class it among sensations of taste, some among muscular sensations, while others have wished to distinguish it from either class. Many of the sensations of taste and smell are so mixed up with sensations of touch that they cannot be called anything pure and simple. Salt, sour and astringent tastes, pungent and sharp smells, are really combinations of sensations of taste and smell with sensations of touch. The pleasantness of many sorts of food (*e.g.* jelly) is certainly derived chiefly from their effect upon the delicate skin of the palate, and is therefore much more a question of touch than of taste. In the wider sense in which it is customary to speak of taste, the Shah of Persia was right when he reproached Europeans (who used knives and forks) for not knowing that the sense of taste begins in the finger tips. Again, not only smell, but also sight, plays a part in the enjoyment of food, for we cannot tell the taste of a thing so well in the dark as when we can call sight to our aid. An isolation is here possible only by artificial means, and will often result in showing that the sense of taste proper has nothing at all to do with the apparent sensations of taste.

The sensation we have when we lift a weight from the ground is very complex. Contact, pressure, and muscular effort mingle in an indefinite whole, which becomes the more complicated from the fact that several different muscles, and in different degrees, are called into play. And yet it may seem to us as though we had a simple sensation.

In respect of sensations belonging to one definite sense, it might be expected that the matter would be simpler and plainer. But even in this case it may be disputed whether a sensation is given in immediate apprehension as simple or as complex.

Goethe held, *e.g.*, that only the sensations of yellow, blue, and red are simple. These he called primary colours, and the other colours he regarded as composed of these, since, as he thought, in violet he could trace red and blue; in green, yellow and blue; and in orange, yellow and red.[1] At the present day, on the contrary, E. Hering maintains that green is a perfectly simple sensation, and that yellow and blue can never be experienced together as elements of a compound colour. He draws up accordingly a scale of four primary colours—red, green, yellow, and blue.[2] That such skilled observers should come to such decidedly different results is a proof of the untrustworthiness of direct psychological apprehension in these doubtful points. The matter itself admits evidently of another possibility, namely, that *all* sensations of colour may be simple. Any one who accustoms himself to abstract from recollections and preconceived ideas, and to concentrate his attention on a narrow zone of the scale of colours, will certainly be able to obtain a perfectly simple sensation of every single colour, and if language had words enough, would feel the need of expressing each of these shades of colour by a separate word. It must be added that the dispute would begin all over again, if we had to specify which precise shade of red, green, etc., was the primary colour. Each several observer would name his shade, and would maintain that all other shades resulted from admixture of other colours. When expressions of language contain a reference to certain primary colours, this is probably to be explained either by the fact that the colours of certain striking natural objects (green plants, red blood, etc.) were early imprinted upon and controlled the mind, or by the fact that the retina is more susceptible to some colours (especially yellow) than to others.[1]

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[1] *Farbenlehre*, vol. i., § 60. [Eng. tr. by Eastlake.]

[2] *Zur Lehre vom Lichtsinne*, 2nd ed., § 38. These four had already been given by Leonardo da Vinci.

But while a distinction may not be drawn between primary and composite colours, there is on the other hand reason to believe that every colour-stimulus is accompanied by a colourless light-stimulus, which passes, when the strength of the stimulus is greatly decreased or increased, into distinctly colourless sensation (of white, grey, or black). It is only with a stimulus of medium strength, that the colour-stimulus (the chromatic irritation) preponderates over the colourless stimulus (the achromatic irritation). This admixture of a chromatic and an achromatic process in the visual organ is inferred partly from the fact that those parts of the retina situated farthest from the point of clearest vision (the yellow spot, *fovea centralis*) are under ordinary circumstances colour-blind, partly from the fact that every sensation of colour passes into a colourless sensation if the strength of the stimulus is sufficiently decreased or increased.[2]

In the province of hearing sensations seem to be compound also. Every tone has its timbre, that is to say consists of a combination, different according to the source of production, of a fundamental tone with weaker "higher tones" or harmonics. The same tone therefore sounds different, if produced on different instruments. But just as the practised ear in a concert may distinguish the share of each instrument in the effect produced, so may specially endowed or well-practised organs of hearing pick out the partial tones in a sound, even though to immediate sensation it seems quite simple. A simple tone is thus properly an abstraction, since we certainly never hear tones or sounds quite without *timbre*. There is only a difference of degree between a tone (*Klang*) and a chord (*Zusammenklang*), a difference conditioned by the weakness or strength of the harmonics relatively to the fundamental tone.[3]

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[1] *Cf.* V.-Krenchel, *Om Grundfarver* ("On the Primary Colours"), Copenhagen, 1880, p. 11, *seq.*; (also in Gräfe's *Archiv. für Ophthalmologie*, 1880); Wundt, *Physiol. Psychologie*, i., p. 415 (3rd ed. i., p. 451); Fick, *Die Lehre von der Lichtempfindung* ("The Theory of the Sensation of Light"). (Hermann, iii., 1), p. 192, *seq.*

[2] Wundt, *Physiol. Psychologie*, 1, p. 453 (3rd ed. 1, p. 491)

[3] [*Cf.* Bernstein, *Five Senses of Man*, p. 245, *seq.* (Tr.)]

This theory, propounded by Helmholtz and generally accepted, shows how the compound nature of subjective sensations may be established by way of physical and physiological experiment. The sensation of tone (*Klang*) is resolved into elements, the relations among which determine the character of the sensation. But if this is so with one set of sensations, will it not be the same with our other sensations? If we do not with these possess the power of tracing the elementary sensations, out of which the sensation as presented to consciousness is compounded, this may have to do with the fact that the sense of hearing so far surpasses the other senses in the delicacy with which it can discriminate differences and gradations. The study of the sensation of hearing has at any rate shaken the principle of the simplicity of sensations, and has opened a fresh horizon at a point where the accessible psychological world seemed to end.

There are, besides, certain phenomena which point to mental elements simpler than those distinctly received through the senses. The sensations experienced, when the attention is engaged in another direction, or even when we are suddenly surprised, have no definite qualitative character. We start, note that something has happened in or to us, but what this is, whether a light-stimulus, a push, or an electric-shock, we do not know,—at any rate not at the first moment. Thus the more sudden the sensation, and the shorter its duration, the smaller the possibility of classifying it under any one definite sense-quality. This applies also to cases where the excitations are very weak and of very limited range; unless the excitation take effect actually on the palm of the hand or on the face, it is not possible to determine in the case of a weak and limited affection, whether it proceeds from contact or from heat. It seems, then, that in the distinct sensations of temperature and touch, we must recognise results of a combination, by which various elementary sensations are united into groups, which then appear to consciousness as indissoluble unities.—A light-stimulus, if its effect is confined to a very small portion of the retina, calls up only an almost colourless sensation of white, even when the same stimulus applied to a larger portion of the retina, produces the sensation of a very intense colour. So that here again a very limited excitation occasions no qualitative sensation.[1]

It accords with this, that the nerve-process, whatever its nature may be, is carried on in pulsating beats or oscillations. It is the highest law of the general physiology of the nerves, that a nerve-process can never be set up by a state of equilibrium, but only by sudden changes, effected with a certain rapidity, in the condition of the nerve. A seemingly continuous nerve-process (a tetanus) is really only brought about by a series of quickly succeeding changes of equilibrium. The relations in the individual sense-organs, so far as known, seem to accord with this law.[1] The sensation, as we know it, must correspond to several such beats or different momenta of the oscillations; in one single conscious instant, in one momentary sensation, there is thus brought together what physiologically occupies several moments of time. And since the structure and mode of action of the nervous system seems to be throughout homogeneous, only one way is open to explain the qualitative differences of sensations, to derive them, namely, from the different ways in which the elementary sensations, which correspond to the single nerve-pulsations or liberations of force, are combined. Just as the different kinds of colour may find their physiological counterpart in the different directions taken by the same brain-molecule,[2] so a further step may be taken and the differences in the *modalities of sensation*[3] be conceived as having their counterpart in yet deeper differences of form and direction among the processes in the central and end organs. This is the only way in which it is possible to understand how the different senses can have arisen in the course of the evolution of organic beings. The farther the descent from the higher to the lower animals, the fewer the modalities found. That which remains as starting-point in the development of sensory activity, is the sense of touch. Out of this the special senses or modalities must have arisen by differentiation. It accords with this, that the special organs in all sensitive organisms are modifications of the external integument.

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[1] Hermann's *Handbuch*, iii, 1, p. 164, 169; iii., 2, p. 322.

This hypothesis (first proposed by Spencer) of the origin of our specific sensations through combination of simpler elementary sensations, opens up a wide horizon. But our chief interest here lies in the fact that, in taking up with this hypothesis, we find at the confines of distinct consciousness, traces of a work which, while undoubtedly carried on below the threshold of consciousness, conforms to the laws that govern consciousness (*cf.* III). The general description of consciousness as synthetic and connective, proves to be applicable also to the ultimate elements to which we are led by analysis of compound states of consciousness. If, then, consciousness is asserted to be only a sum of sensations, the comment must at any rate be made, that the units of this sum are not absolutely simple, but have apparently arisen by synthesis of still simpler elements. A sensation is only a relative conception, as is an atom in the province of material nature.[1]

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[1] Funke in Hermann's *Handbuch*, iii., 2, p. 328, *seq*. The above quoted principal law of the physiology of the nerves was established by du Bois-Reymond in connection with electrical stimuli, 1845. L. Hermann, *Allg. Nervenphysiologie* ("General Phys. of the Nerves,") (*Handbuch*, ii., 1), p. 50.

[2] V. Krenchel, *Om Grundfarver* (In German under the title "Uber die Hypothese von Grundfarben," Gräfe's *Archiv für Ophthalmologie*, 1880), p. 20, *seq*.

[3] *Modality* is a term suggested by Helmholtz for what Fichte calls quality-circle (*Qualitätskreis*): the collective name for all sensations belonging to one class (sight, sound, taste, &c.).

3. Closely connected with the question of the simplicity of sensations is the question of their relative independence. Here again the physiology of the senses yields interesting results.

A certain opposition has to be overcome in the end-organs of the sensory nerves as well as in the nerve centres, before the stimulus can produce its full effect ; but when once this opposition is overcome, the effect will continue for some time after the cessation of the stimulus. This is the general physical law of inertia, as it comes into operation in the physiology of the nerves. The several senses are not, however, all alike in this respect. The greatest elasticity belongs to the sense of touch. By bringing the finger in contact with a cog-wheel, which revolves at a certain rate, we may have as many as 1000 distinct sensations per second. But if the rate is increased still further, there results only one continuous sensation. The sense of hearing comes closest to the sense of touch. But that the latter has the advantage is apparent from the fact that, if the hand is placed on a musical instrument, the vibrations of even fairly high tones are felt as a whirring. In experiments with one ear, the crack of two electric sparks is heard as distinct when the one sounds 0·002 of a second before the other. In experiments with both ears, the limit is higher (0·064 of a second). Electric shocks can still be distinguished when they arrive at the rate of thirty-five in the second ; if the rate is greater, only *one* single sensation is experienced. On the forehead so many as sixty shocks in the second can be distinguished. The sense of sight stands lowest in respect of elasticity, a fact which is accounted for by the nature of the end-organs. After observation of a brightly illuminated object, there remains an after-image when the eyes are closed. The new impression consequently does not find the place empty, but is combined with the after-effect of the previous impression. If a disk, divided into equal alternate sectors of white and black, is set to revolve quickly, the impressions are fused, and there results a continuous sensation of grey, if about twenty-four impressions come per second and if the light equals ordinary daylight. A burning match, if swung round quickly in the dark, presents the appearance of an illuminated circle. When the revolutions are slow, the separate sensations are clearly noted; when the speed is increased, there is a scintillation, and when increased still further, the impressions are all fused in *one* sensation.[1]

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[1] With regard to sensations of taste and smell, there are no trustworthy observations. It cannot be clearly proved that these sensations can be recalled, since it is impossible to be absolutely certain that remains of the matter tasted and smelt are not left in the organs. Vintschgau in Hermann's *Handbuch*, iii., 2, pp. 221, 284.

The blind patient operated on by Franz, found it disagreeable, even several months after the operation, to walk along much frequented streets. The many different objects and the quick movements of men, carriages, etc., so confused his sight that at last he could see nothing; the impression produced by the object last seen not having disappeared before the succeeding object called forth a fresh impression. In this case the separate impressions were not completely fused, but produced a chaos which made distinct apprehension impossible. And at every stage of consciousness a certain rate of succession must be observed if the sensations are to be distinct.

For a sensation to arise there must be not only a certain *interval of time*, but also a certain *contrast*, between the impression it accompanies and the preceding impression. There must be a background, from which the new sensation may stand out. If gently and gradually increased, a stimulus may remain unobserved, even after it has reached a degree of strength which, under other conditions, would call out sensation. The quite gradual increase in strength of an electric current will at length destroy a nerve subjected to its influence, without any sign of sensation. By very gradual increase or decrease of temperature, a frog may be boiled or frozen to death without making the smallest movement. Sensations of warmth or cold arise only when a change in the temperature of the skin is effected with a certain rapidity. A sensation of temperature arises when the skin (or more precisely the thermic apparatus) acquires a temperature which is sufficiently above or below its "zero-temperature" (*i.e.* the temperature which, at the points of the skin concerned, is felt neither as warm nor as cold).[1]

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[1] Fick, Hermann's *Handbuch*, iii., 1, p. 211, *seq.*; Exner, *ibid.*, ii., 2, pp. 256-260. The strong and persistent after-effects in the eye are an important argument for the photo-chemical theory, according to which the setting free of the so-called visual purple in the retina, effected by rays of light, is the real stimulation of the visual nerve. Kühne, *Chemische Vorgänge in der Netzhaut* ("Chemical Processes in the Retina"), (Hermann, iii., 1), pp. 238, 261.

Very weak stimuli are absorbed by previous or simultaneous stimuli, without producing any special sensation. If a person has been electrified for some instants by a strong current, he does not notice a weaker one. If a strong current is received through one hand and a weaker one through the other, the latter is not noticed. If one point of a compass is placed on a painful wound and the other on the skin surrounding it, and an equal pressure applied, only one sensation will be felt, even though the distance between the points be twice that at which two sensations would be produced if both points were on the surface of the wound.[2] Even Hippocrates taught that of two pains, occurring at the same time but not on the same spot, the smaller would be suppressed by the greater. Shakspeare makes King Lear express the same thought; for grief and rage he heeds neither rain nor storm, for "where the greater malady is fixed, the lesser is scarce felt," as contrariwise, "When the mind's free, the body's delicate." In a highly excited state of consciousness, even strong impressions can obtain no great hold. The ecstatic enthusiasm of martyrs must weaken their sense of suffering. Similarly hypochondria and mental distraction may prevent painful sensations; the fixed idea which arrests consciousness may be so strong, that no other impression is able to attract the attention.

The *threshold of consciousness*, then, is not always at the same level, but *is raised* when there is not a great enough contrast to preceding or simultaneous impressions. On the other hand, *it is lowered* under certain conditions, as a result of custom or accommodation. If a sound is listened to as it dies away, it can be followed down to a minimum strength, inaudible to any one who has not heard it at the beginning. The eye can follow the flight of a bird to a distance at which the bird could not be discovered by any one freshly looking for it. It is easier for consciousness to retain a given weak impression than to take in a fresh impression which in itself is stronger.[1] An example of the lowering of the threshold of consciousness is given in the capacity which prisoners, after long confinement in dark places, acquire for observing the smallest objects and the faintest differences in the light. In order to practise his eye in discriminating very small differences of light, Lavoisier confined himself for six weeks to a room draped in black.—The lowering of the threshold of consciousness is thus conditioned in a manner analogous to its raising; the *gradual* decrease of impressions does not destroy a sensation, any more than their gradual increase produces one.

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[1] *Cf.* Fick, *Anatomie und Physiologie der Sinnesorgane*, p. 54; Hering, *Der Temperatursinn*, (Hermann, iii., 2), p. 415, *seq.*; Richet, *Recherches sur la Sensibilité*, p. 42, *seq.*

[2] Richet, *Recherches*, p. 168, 222.

Perfectly constant and uniform impressions and states do not come into consciousness, are not accompanied by sensations. The pressure of the air is noticed only when it varies. The very rapid movement of the earth carries us round without our knowing it, because it is constant. We do not notice that the blood-vessels of the retina cast shadows on the retina itself, because we have always been accustomed to them; these shadows do, on the contrary, attract notice, when they are artificially cast on to parts of the retina accustomed to stronger impressions of light. A substance affords sensations of taste only if its taste is different from that of the saliva. For the tongue is accustomed to the saliva, and therefore deadened to its slightly salt taste.[2]

Fechner has tried to find a mathematical formula to express the ratio in which the effect produced by each stimulus is determined by the preceding stimulus. From experiments made by himself and others, he thinks the rule may be deduced *that the increase in sensation, resulting from an increase in the strength of the stimulus, depends, not on the absolute increase, but on the relation of the increase to the preceding stimulus.* If the sensation is to increase to a certain degree, the stimulus must increase the more, the stronger it is to begin with. Fechner expresses this by saying that *the strength of the stimulus must increase in geometrical progression, in order that the sensation may increase in arithmetical progression.* If the sensation is to rise from 1 to 2, the stimulus must rise from 10 to 100; and that the one may rise from 2 to 3 the other must rise from 100 to 1,000, and so forth. Fechner himself allowed that this rule holds good only for stimuli of a medium strength. There is a definite limit to the sensibility of the visual organ, and if two stimuli of unequal strength both exceed this limit, the difference between them cannot, from the nature of the case, be apprehended.

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[1] Richet, *Recherches sur la Sensibilité*, p. 170, *seq.*

[2] Helmholtz, *Physiologische Optik*, p. 161; Henle, *Ueber den Geschmackssinn* ("On the Sense of Taste") (*Anthropol. Vorträge*, ii.), p. 18. [Bernstein, *Five Senses of Man*, p. 80, *seq.* (Tr.)]

The lower limit to the rule is conditioned by the fact, that, when the stimuli are very weak, the internal condition of the organ and of the nervous system comes appreciably into play. In respect of the eye, the so-called "natural light," which arises without any external influence, effects a sort of "normal hallucination."[1] The other senses also seem to be never wholly free from subjective sensations, which become of much importance only when external stimuli are very weak. Very weak stimuli are, moreover, incapable of overcoming the resistance offered by the retina.[2] But even with regard to stimuli of medium strength, the universality of the rule has been brought into question; it appears to have undisputed approximate validity only for medium stimuli in the provinces of the visual and muscular senses, and perhaps of the sense of hearing. The question which still awaits a satisfactory answer is, whether special reasons can be shown for the exceptions to the rule which occur in several of the sense-provinces.

But whether a mathematical formula can be successfully applied or not, all experience points to the fact that the rise and prominence of sensations are determined by their reciprocal relation. Every sensation, as it emerges, has to undergo a struggle with other possibilities of sensation, and it depends on the result of this struggle whether the sensation comes at all into consciousness and with what degree of clearness and definiteness. The several members in the series of sensations are not therefore absolutely independent of one another. This is ground where it is difficult to find the right expressions. For if it is said that sensations fuse through rapid succession, or where the difference in strength is too small or too great, it may be objected that under these circumstances sensations do not separately arise at all, and that consequently they cannot be said to fuse. We stand here at the very threshold of consciousness, where the psychical elements approach unconsciousness, and where, consequently, psychological terms can be only half figuratively employed. The general psychological bearing of the phenomena seems, however, clear enough; *there is no series of absolutely independent sensations, but every sensation is determined by its relation to the one experienced immediately before it or at the same time.*

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[1] "The black that we see in the dark and when our eyes are shut, is a sensation of light which we have without external stimulus, not to be confounded with the seeing nothing which we have in the finger or at the back of the head, and not to be compared to the hearing nothing when there is no external sound. The black which we see when our eyes are closed, is only the same sensation of light which we have when we look at a black surface, and which may go through all gradations up to the strongest sensation of light; indeed the internal black in the eye itself is sometimes changed by purely internal causes into clear light, and is sprinkled, so to speak, with luminous phenomena. On closer attention, we discover in the black of the closed eye a sort of fine light-dust, the abundance of which varies in different persons and different conditions of the eye, and which in pathological states may amount to brilliant appearances of light." G. Th. Fechner, *Elemente der Psycho-physik.*, 1, p. 165, *seq.*

[2] E. Kraepelin in Wundt's *Studien*, ii., p. 324.

4. A corresponding rule is found to hold for the *quality* of sensations.

The same excitation may, under different circumstances, produce the sensation now of warmth, now of cold. If, *e.g.*, the hand is placed in a vessel of the same temperature as the room, a temperature to which it is accustomed, warmth is felt, because the radiation of heat from the hand is prevented in the smaller space. If one vessel is filled with water of the temperature corresponding to that of the hand, a second with water of a higher, and a third with water of a lower temperature, and if the right hand is dipped in the second and the left hand in the third vessel, and then both together in the first vessel, the right hand will feel cold and the left hand warm in this first vessel where previously neither would have felt cold or warmth.

The same movement is felt either as exertion or as rest, according as it succeeds a slower or a more violent movement. The sense of rest, indeed, only properly arises through contrast to the sense of change or motion. Sudden cessation of a stimulus may give rise to a very lively sensation, as when an unexpected pause in a loud piece of music startles the audience, or when the miller is awakened by the stopping of the mill. The same surface appears rough or smooth according to the character of the preceding or accompanying sensations of touch. The taste of wine is brought out by eating cheese; after bitter or salt tastes water seems sweet.

This *effect of contrast*, through which the special quality of sensation is seen to be subject to conditions similar to those that determine the rise of sensation in general, is especially conspicuous in the province of visual sensations.

To see only one single colour would be the same as seeing no colour at all. If several very small coloured objects are placed side by side, their colour quality may often be apprehended, although that of one of them, at the same visual angle, cannot be recognised.[1]

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[1] Hermann's *Handbuch*, iii., p. 199.

The deepest black is apprehended only by the side of the purest white, and in contrast to it. The different colour qualities come out most strongly (are most deeply "saturated") when accompanied by their complementary colours. Colours are called complementary when their combined rays produce the sensation of grey or white. The complementary colours are :—

Red	Bluish green.
Orange	Azure blue.
Yellow	Indigo blue (ultramarine blue).
Green	Purple.
Violet	Yellowish green.

If one colour is placed by the side of another which is not its complementary colour, the one will always be affected by the complementary colour of the other. A grey strip on a coloured ground receives a tinge of the colour complementary to the ground, and if a grey strip is laid upon a succession of differently coloured pieces of paper, it acquires a different tinge on each piece of paper. In making this experiment, we must place a piece of thin transparent paper over the grey strip ; for if there is a distinct outline between the strip and the ground, the tinge does not appear.[1]

Contrast may be not only *simultaneous* but also *successive*. A colour will appear "saturated," not only when seen by the side of its complementary colour, but also when it immediately follows it. If the eye is allowed to dwell for some time on a certain colour, it becomes the more disposed to a strong sensation of the complementary colour. And if the eye is transferred from a colour to a white or grey ground, it sees in the latter a tinge of the complementary colour ; thus a reddish gleam is seen on a white wall, if a green curtain has been previously gazed at. The most distinctly marked sensation of a colour arises through the combination of simultaneous and successive contrast.

Without being noticed, similar effects of contrast enter into all our sensations of colour. We seldom look long at *one* point, for it requires a certain effort to fix the gaze for even a short time, and after-images from the one point of the visual orbit influence in consequence the apprehension of other points. The most complicated combinations of simultaneous and successive contrasts are often produced.

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[1] [*Cf.* Bernstein, p. 161. (Tr.)]

The effect of contrast does not rest upon erroneous inference or upon illusion. Such an explanation would be possible only if the effect of contrast were confined to exceptional cases. But it is always experienced in a greater or less degree, at any rate in the province of sight, and it is consequently impossible to point out a normal sensation. What is the ground on which a colour must be seen for its true quality to be recognized? In practice, of course, a normal or typical shade is taken as the true colour; but in reality every determination of quality is relative. In its quality, as in its existence, every sensation is determined through its relation to other sensations.[1]

5. The study of sensations thus corroborates the general account of consciousness given in an earlier chapter (II. 5). It is impossible to resolve consciousness into a series of simple and self-existent sensations, absolutely independent of one another. A sensation which stands in no relation to any other is not known to us. This law may be called *the law of relativity*.[2] *From the moment of its first coming into being, the existence and properties of a sensation are determined by its relation to other sensations.*

The law of relativity accords with the principal law of the physiology of the nervous system, that no constant state, but only a change effected with a certain suddenness, calls to life a nerve-process. The preceding state of the organism and of consciousness thus forms a background to the succeeding state. Effect of contrast in its narrow sense is only a specially striking example of what in some measure takes place, and must take place, in every sensation. It is so easily overlooked only when the degree of contrast is small, or when two sensations are at such a distance from one another that they are not thought of in conjunction; the intermediate links are then forgotten. The clearly defined and distinct sensations are built up out of a host of slightly differing sensations.

The distinction or the relation may be either *simultaneous* or *successive*. The successive relation is, however, the most primitive. Simultaneous sensations have a tendency to fuse (especially in the departments of touch, taste and smell); and since, on the other hand, the attention is no more quiescent than is the bodily eye, but wanders from point to point, even a complex stimulus is from the nature of the case apprehended as successive. Moreover, successive apprehension is clearer than simultaneous. Small distinctions of weight are more easily perceived by weighing successively with the same hand than by weighing simultaneously with both hands; the temperature of two liquids is compared better by putting the same hand successively into both, than by putting either hand simultaneously into one of the liquids. Very faint shadows are noticed only when the object which casts the light is moved. Infants and the lower animals appear to have far smaller power of distinguishing between simultaneous, than between successive stimuli. This accords with the general law of relativity and with the fundamental law of the physiology of the nervous system; for excitations at rest do not occasion anything like the same change and the same contrast as excitations which succeed one another. Successive contrast takes effect more forcibly than contrast between things given together.[1]

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[1] In the opinion of some, qualities of sound form an exception, no effect of contrast taking place in these. Others maintain that a tone sounds differently, according as it is taken in the ascending or descending scale.—If the exception is more than apparent, the inquiry must be made whether it may not be founded on special conditions of the sense of hearing.

[2] This term was, so far as I know, first introduced by Wundt. [For its several applications, see *Ency. Brit.*, Art. "Psychology" (under Theory of Presentation). (Tr.)]

As already observed, no distinction can be drawn between absolute and relative sensation, or between sensations and differences of sensation. This consequence of the psychology and physiology of sensation is, however, still disputed even by such a writer as Fechner, who has done so much to show the importance of the law of relativity. "It is true," he says,[2] "that, since we never have sensations of a certain kind or strength without preceding or accompanying sensations of a different kind or strength, no strict experimental proof can be adduced of the possibility of having sensation which is not so preceded or accompanied; but I find neither theoretical nor experiential grounds to forbid the supposition, and accordingly *believe*—nor can the contrary view be based on more than a belief—that, if a child were to awake for the first time in an absolutely uniform bright light, all other stimuli being so far as possible removed (though it is true they could not be completely removed), he would still see the brightness of the light.'' Fechner recognized correctly that it is necessary to go back to the first sensation, that is, to the beginning of consciousness, if the law of relativity is to be escaped. His example, however, affords no absolute beginning; for the child awaking to the brightness of the light, would have had general and motor, and perhaps other sensations, before he received the sensation of light; this latter sensation would therefore have those indefinite sensations as a background, and consequently would make its appearance with a character different from all later sensations of light. Perhaps preparations might even have been made for it by internally aroused processes in the visual organ, in consequence of which the threshold would have been already crossed. Moreover, the light-stimulus (even if in itself absolutely uniform) does not produce precisely the same effect in two successive moments; in the first moment there is a vague apprehension and excitement which only gradually gives way to sight proper; and in this transition the law of relativity takes effect, for the state in each moment is determined by that which preceded it. This at least is certain, that the more nearly a mental state approaches to absolute unity, or rather simplicity, the closer is the approach to the confines of consciousness. (*Cf.* II. 5.) It cannot therefore be supposed that all shades of difference and all rhythm can disappear while consciousness still exists.[1]

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[1] E. H. Weber, *Tastsinn und Gemeingefühl* ("Sense of Touch and Common Sensation") (Wagner's *Physiol. Handwörterbuch*, iii., 2), p. 544; Fechner, *Elemente der Psychophysik*, i., p. 174; G. H. Schneider, "Warum bemerken wir mässig bewegte Gegenstände leichter als ruhende?" ("Why do we observe objects moving at a moderate rate more readily than objects at rest?") (*Vierteljahrsschr. für Wissensch. Philos.*, ii.) p. 411.

[2] In *Sachen der Psychophysik*, p. 114.

If the law of relativity has complete validity, no sharp line can be drawn between sensation and thought. In the way in which, in successive relativity (*e.g.* in the effect of successive contrast), the preceding determines the succeeding sensation, an elementary memory is apparent. The influence of distance in time, of opposition and contrast, shows us sensation as a discrimination, an apprehension of differences, an elementary comparison. Here therefore is the very simplest form of the same conscious activity, which at higher stages of development makes its appearance as thought proper. And, finally, it is clear that the interaction among sensations, which conditions their rise and their quality, is possible only because all sensations are members of one and the same consciousness, which embraces and unites them. No contrast is possible between my sensation of red and *another person's* sensation of bluish green. Even if we conceive consciousness as a series of sensations, synthesis is still therefore a necessary presupposition.

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[1] Stumpf (*Tonpsychologie*, i., p. 10) objected to this (*apropos* of my article "Zur Psychologie der Gefühle" ("On the Psychology of the Feelings") in the "*Philosophischen Monatsheften*," 1880, in which the above line of thought had already appeared), that just as certainly as the conscious life of the individual must have had a beginning, there must have been a first sensation; and since this could not stand in relation to any other sensation, he regarded the law of relativity as condemned.—It is not, however, so certain that there must have been *one* first sensation. It is also conceivable (*cf.* III. 6 and 9) that several sensations, mutually conditioning one another, should emerge together; and this is, in fact, the most probable view, for every organism, at every instant, is subject to various different external influences, while, in addition, the internal states of the organism act more or less upon the brain.—Stumpf does not take into account the fact that, from conscious life as we know it and are able psychologically to study it, we cannot make in the slightest degree intelligible a first simple sensation of this kind. If conscious life begins with a single first sensation, then it begins with a condition to which we have no parallel. (*Cf.* also II. 5.) Noteworthy in the extreme is the conclusion which Stumpf draws from the necessity of a single first sensation: "The universality and necessity of relativity in the emergence of sensations, is to be regarded merely as a something acquired, as a 'second nature,' like every strong habit." If the peculiar property of our conscious life, expressed in the law of relativity, is a habit,

A main point in the philosophy of Kant is corrected by these results. Kant distinguished sharply between the matter and the form of our knowledge. Sensations he regarded as a passively received matter, which is arranged by a formative activity, derived from a source wholly different from sensations. These latter, the material of knowledge, are, according to Kant, *given*, while the forms in which the material is arranged and worked up, are *à priori*, that is to say, lie in the nature of our consciousness. Kant's argument is that "that in which alone sensations can be arranged and put in a certain form cannot itself be sensation." According to the law of relativity, however, sensations form and determine one another uninterruptedly, and no absolutely unformed matter is to be found in consciousness; such matter would involve the possibility of pure, absolutely independent sensations. The difference between matter and form is only *one of degree*. Psychological experience affords only approximations to purely passive sensations—and even these are approximations to the confines of consciousness.[1]

6. Even if the sensations are regarded as only given or received, it must be observed that they are not all derived from the external world. For in the first place the organism is itself a little world,

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then it is a habit which is acquired very early (immediately after the first sensation), and a "second nature" that appears so early might well be placed in the rank of a "first nature." As is seen, Stumpf does not really reject the law of relativity, although he denies that it states an original property of conscious life. He tries to draw a distinction between the sensation itself, and its discrimination. But every proper discrimination pre-supposes the interaction of the sensations themselves, which is the earliest form of the conscious activity, called at a higher stage comparison and judgment. Language has provided no perfectly adequate expression for a relation so elementary as this.

[1] This was clearly seen by Salomon Maimon, one of the most penetrating disciples of Kant. "Sensation," he says, "is a modification of the cognitive faculty, realized in it only through endurance (without spontaneity); but it is *a mere idea* to which we may approach through the *lowering of consciousness*, but which we can never really reach." *Versuch über die Transcendentalphilosophie* ("Essay on the Transcendental Philosophy"), Berlin 1790, p. 168. Maimon is, however, inconsistent in his *Philosophischen Wörterbuch* ("Dictionary") (1791), when he defines "sensibility" as "the capacity of perceiving sensuous qualities in themselves, *apart from all connection and relation of one to another.*"—P. 14.

confronting the greater world with a certain independence. Its own internal activities yield important impressions (general sensations). Nutrition, the circulation of the blood and respiration pursue their course independently, to a certain extent, of what passes without; and these internal processes excite stronger or weaker sensations. In the second place, the organism does not wait for the external world to bring stimuli to it, but executes movements which are accompanied by sensations: *motor-sensations.* Even before sensations arise through excitations from the external world, movements, as some hold,[1] are executed in consequence of the superabundance of potential energy in the nerve-centres. These movements, from a psychological point of view spontaneous and unmotived, can occasion motor-sensations, which are probably among the very earliest sensations of dawning consciousness.

The change or transition, which every conscious act presupposes, or in which it consists, may thus be as well active as passive in character. Excitations not only come to us from without, but also pass out from us. And the active changes may even perhaps precede the passive, since conscious life first finds expression in spontaneous, reflective and instinctive movements (*cf.* IV. 4—6).

From the psychological standpoint, motor-sensations may be divided into two groups; into sensation of effort and muscular sensation. *Sensation of effort* is the sensation of the energy exerted in carrying out a certain movement. We adjust and measure, voluntarily or involuntarily, the degree of effort required for a certain movement, and, before the actual movement, can have a pre-experience of the energy as thus called up. Similarly, without actually attempting a movement, we can feel our powerlessness and exhaustion. *Muscular sensation* is a sensation of the temporary state of one or more muscles. It may come from muscles which are not under the control of higher nerve-centres (as the sensation of cramp in the leg, colic, labour-throes), but may also result from the state into which the muscle is put by motor-impulses from the brain (sensation of muscular tension, or of fatigue).

On the other hand, it is still uncertain whether these two classes of sensations are equally distinct as regards their corresponding physiological processes. It is held by some that the motor-process set up in the motor-centres of the brain, before leaving the brain, sends through nerve-fibres an excitation from the motor to the sensory centres. This would give a class of sensations due to excitations originating in the brain itself. These have been called *sensations of innervation.* This view was held by Joh. Müller,[1] who relied chiefly on the argument that, before an actual movement, before raising a weight or mounting a flight of steps, we can feel the degree of effort about to be made. Others explain all motor-sensations, sensation of effort as well as actual muscular sensation, as due to excitations sent from the muscle to the brain, which thus receives as it were notice of the commencing or completed contraction of the muscle. That we feel or calculate in advance the force to be applied, is, then, to be explained by the effect of experience and habit. If this latter view is correct, and it has been much strengthened by Sachs' discovery of sensory nerves passing from the inside of the muscle to the higher centres,[2] then in the sensation of effort we experience not the actual commencing motor-process, but its effect.[3]

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[1] [Bain, *Mental Science*, p. 14 *seq.* (Tr.)]

7. In almost all special sensations, the movements of the organism play an important part, so that on closer examination sensations of effort or muscular sensations are found as elements in states which on superficial consideration we take to be perfectly simple. In tasting, the movement of the tongue is of importance; solid pieces of food are pressed against the hard palate, and only so can be tasted. Sensations of smell arise only if the air is drawn in through the nose. If the air be kept out, all sensation of smell ceases, even in a heavily scented atmosphere. In hearing, we move the body, or at any rate the head, until we find the position in which the sound is loudest. In attentive listening the muscles of the tympanum contract. Movement is, however, especially important in the senses of sight and touch. The eye must be accommodated to the distance of the object, and this is effected by contraction of delicate muscles, the surface of the lens being thus made more convex; this change is effected with a certain effort. In every definite position of the eye some muscles are actively contracted, others passively relaxed; every position of the eye is therefore accompanied by a certain sensation of effort or a muscular sensation. We move the eye, or even the whole head,

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[1] *Handbuch der Physiologie*, Coblenz, 1840, ii., p. 500.—According to Panum, stimuli from the muscle and immediate stimuli of innervation cooperate in the sensation of force. *Nervevaevets Fysiologi* ("Physiology of the Nerve-tissue), p. 95.

[2] Sachs, "Physiol. u. Anatom. Untersuchungen über die sensiblen Nerven der Muskeln" ("Physiological and Anatomical Investigations into the Sensitive Nerves of the Muscles") (Reicherts u. Dubois Reymond's *Archiv*, 1874).

[3] [For full discussion of the question, see *Brain*, 1887. (Tr.)]

until the excitation of light falls upon the place of most distinct vision (the yellow spot). The delicacy of the sense of touch in the different parts of the body stands in a definite relation to the mobility of those parts; it is (according to Weber) greatest in the tongue, the lips and the fingers, least in the chest and back. To the movable parts of the body the sense of touch owes its importance; it is by their means that active experiment is possible. Touch and sight, the two senses linked to the most movable organs, are in conjunction the most powerful means we possess of determining our relations to the external world.

We are thus not given over as a purely passive prey to the impressions of the external world. In the spontaneous and reflex movements which precede the birth of consciousness, an active nature is already apparent. The excitations from without soon, moreover, call forth movements, which serve to retain or pursue them. There is now an active turning towards the excitation, as when an infant follows or searches for a light with his head or eyes.[1] An *involuntary search and accommodation* help to determine the character of the sensations. How primitive this first form of attention is, may be judged from the fact that a pigeon deprived of its cerebrum will turn its head after a light that is being moved away. Attention still bears here the stamp of reflex movement. A conscious concentration of attention (voluntary attention) presupposes a certain development of the faculty of remembering, and of forming ideas independently of purely momentary impressions, and is therefore found only at a higher stage than that now under consideration.

The sensation of attention is closely related to the sensation of effort or muscular sensation, and is perhaps connected with the fact that a stronger or weaker contraction takes place in the muscles of the organ concerned.

Condillac's theory, that attention is only an "exclusive" sensation,[2] is, then, contradicted even by direct, subjective observation. If a sensation takes complete possession and almost succeeds in driving all else out of consciousness, it then arrests our activity also. An exclusive sensation therefore *presupposes* attention, but is not one with it. Besides, how does a sensation become exclusive? Excitations can flow in upon us simultaneously from several sides. The eye, *e.g.*, receives simultaneous excitations from several points of light. Several senses, moreover, may be in operation together. If purely passive, sensuous perception would afford at every instant a chaos of diverse sensations. But from the multitude of these diverse sensations, in every tiny instant, *one* is selected which becomes the centre. Reflexly and instinctively the attention moves from one excitation to another. As has been seen, the successive is more easily and earlier apprehended than the simultaneous; this seems to stand in connection with the great importance of movement in sensuous perception.[1]

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[1] "I saw a seven months' child, when two days old, in the evening at dusk repeatedly turn his head towards the window and the light, even when he was moved to another part of the room. He doubtless looked for the light." Kussmaul, *Untersuchungen über das Seelenleben des neugebornen Menschen* ("Investigations into the Mental Life of Infants"), p. 26.—It is only later, according to Preyer, *Die Seele des Kindes*, p. 31 (*The Mind of the Child*, Trans. in Int. Educatl. Series, vol. i. pp. 43, 44), when a child is twenty-three days old, that its eyes follow the light without movement of the head.

[2] *Logique*, i. 7; *cf. Traité des Sensations*, i. 2, 1.

The motive which decides the attention to leave one excitation and turn to another is to be looked for in a sense of fatigue or in a feeling of dulness, which makes it a necessity or a recreation to turn to a new excitation, especially to one which is a natural counterpart or supplement of the preceding excitation (*cf.* the effect of contrast). In every such transition an *elementary choice* takes place.

B. Ideation.

1. In the interaction of sensations and in involuntary attention, unity and activity of consciousness are as yet manifested only in a quite elementary way; the phenomena are here so simple that it is even difficult to find psychological expressions for them. But the province of pure sensations is now to be overstepped, and attention turned to the fact that the new sensations are determined and modified not only by the immediately preceding and simultaneous sensations, but also by others more remote in time. This takes place by the new sensation re-exciting earlier sensations.

This presupposes that sensations repeat themselves. A consciousness that were to pass continually to new impressions, from *A* to *B*, from *B* to *C*, and so forth, would never advance beyond the elementary stage we have described. But no consciousness is thus constituted. Beings endowed with consciousness have their definite conditions of life, which do not merely make existence possible, but also narrow the horizon, since the series of impressions is not infinite but unfolds itself with a certain rhythm. The experiences (sensations) of finite beings must be limited, because their existence is bound up with certain conditions, some of which are constant, while others must recur at not too remote intervals. Without repetition no life, and consequently no conscious life, would be possible. Life consists in an alternation between the absorption of matter (assimilation) and the waste of matter (disassimilation), between vegetating and functioning. In organic functions a rhythmic repetition is therefore found; as in inspiration and expiration, the circulation of the blood, sleeping and waking. And this rhythm in the phenomena of organic life seems to be only a special instance of a general law of nature, for there is much which points to the conclusion[1] that all movements and changes in nature are periodic.

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[1] Condillac, however, in spite of his own definition, recognizes the independence of the element of attention, when he says, "Lorsqu'une campagne s'offre à ma vue, je vois tout d'un premier coup d'œil, et je ne discerne rien encore. Pour démêler différens objets et me faire une idée distincte de leur forme et de leur situation, il faut que *j'arrête mes regards* sur chacun d'eux . . . Ce regard est *une action par laquelle mon œil tend à l'objet* . . . par cette raison je lui donne le nom d'attention; et il m'est évident que *cette direction de l'organe* est toute la part que le corps peut avoir à l'attention."

The most elementary consciousness would be one in which there was only a rhythmical alternation of pleasure and pain together with the accompanying simple sensory and motor sensations. Then, if the series of sensations had arrived say at D, A would occur again—at all events as A_2, for the sensation might not have precisely the same quality. A repetition of the same sensations would not, however, have any psychological significance, had not consciousness the power of reproducing the previous similar sensations, were these latter on the contrary to disappear without leaving the smallest trace. The psychological importance of repetition consists in this, that—the power of reproduction being assumed—it is possible for consciousness to combine earlier with later sensations and experiences. We have here a fundamental property of consciousness which admits of no closer explanation. It is a fact, that when the sensation A occurs again after an interval which has been occupied by the sensation B, it has *a tendency to reproduce the state* which preceded B; it profits by this repetition, since it utilizes the traces previously left behind by A. Here the *law of practice*, which holds good for all organic life, comes into force. All function is made easier by repetition and practice. This is true especially of the functions of the nervous system; indeed, all practising of complex movements is properly exercise of the central nervous system. The nerve-tracks are, so to speak, more practicable the oftener they are traversed. A sensation acquires through repetition a certain distinguishing mark, confronts with a special character other sensations which, so to speak, can be compared with one another, not each with itself. There enters a contrast between that which is repeated, familiar, customary, and that which is new, not hitherto experienced; between the known and the unknown.—Sometimes the influence of repetition and remembrance may call up a sensation which would not otherwise arise. The partial tones in a chord can be distinguished when there is a lively recollection of the sensation they produce as simple tones; but if some time has elapsed between the sensation of the simple tone and the sensation of the chord, it is no longer possible to distinguish between them. Two tones so closely related as to be only just distinguishable when heard in immediate succession, appear to consciousness as one and the same when the interval is from half a minute to a minute. If not more than 15—30 seconds elapse between two sensations of weight, a difference between 14½ and 15 ozs. may be distinguished; but after the lapse of 40 seconds this is no longer possible.[1] If we wish for examples from more complex phenomena of consciousness, we may think, *e.g.*, of the difference between reading a book or hearing a piece of music for the first and the second time; the second time everything is taken in more clearly and distinctly, without its being precisely necessary to think of the first time.

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[1] Herbert Spencer, *First Principles*, ii. 10; Jevons, *Principles of Science*, second ed., pp. 448, 560, *seq.*

The reproduction of earlier sensation or experience does not, in such cases as these, amount to an actual and distinct recall. For the reawakened state fuses immediately with the given sensation, and does not stand out beside it as a free and independent representation. There takes place an involuntary classification, a reference of the sensation to earlier sensations of like kind. To say that little children and blind persons whose sight has been restored, must *learn to see* colours, really means that they must learn to *recognize* them, to refer the given sensations of colour to similar earlier sensations. The very first sensations of colour can be referred only to analogous sensations of different modalities, as in the case of the man blind from birth, who, when an attempt was made to describe to him the colour scarlet, at last exclaimed, "It must be something like the blast of a trumpet."

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[1] Helmholtz, *Die Lehre von den Tonempfindungen* ("The Theory of Sensations of Tones") (Brunswick, 1863), p. 110, Eng. trans. by Ellis, p. 103; G. H. Schneider, "Die psychologische Ursache der Kontrasterscheinungen" ("The Psychological Cause of the Phenomena of Contrast") (*Zeitschr. für Philosophie*, 1884), p. 164, *seq.*; E. A. Weber, "Tastsinn und Gemeingefühl" ("Sense of Touch and General Feeling") (Wagner's *Handwörterbuch der Physiologie*, iii. 2), p. 543.

In such immediate and involuntary recognition consists *perception*. The psychological process which here takes place may be described as the fusing of a reproduction and an actual sensation. The percept is thus conceived as compounded out of a representation and a sensation; but the representation does not come into consciousness as a free and independent factor, and it may therefore be described as an *implicate* (*gebundne*) *representation*. And as we called the immediate interaction among successive sensations *elementary* memory, so we may call the memory conditioning the percept '*implicate*,' because what is remembered is not disengaged from the sensation which calls it up. Since, finally, the percept comes to exist only through the similarity of the given to former sensations, the activity which is here displayed may be described as an involuntary comparison. And this is an *implicate comparison*, since the elements which on account of their similarity are combined, do not make their appearance as distinct and independent. The more frequent the repetition, the more easily, quickly, and unconsciously is the recognition effected. By repetition and practice, the "discrimination-time" (which might also be called "recognition-time,") as well as the "will-time" (IV. 6), is reduced.[1]

In various experiences, springing in some cases from healthy, in some from abnormal states, this contrast between mere sensation and perception is clearly apparent. On first awaking from sleep, we often have sensations which we cannot recognize. A multitude of diverse elements emerge into consciousness, without being immediately classified. It is only when quite awake that we attain to perception proper, and with it to clear consciousness of our surroundings. What distinguishes the dreaming from the waking consciousness is in great measure this, that the same sense-impressions are differently apprehended or explained, and differently classified (*cf.* III. 8). When we are aroused by a stimulus which excites strong interest,—or, as it has been expressed, when the "psychical relation" of the stimulus arouses us,—we have a percept which is just on the borders between dreaming and waking. One of Charcot's patients lost, after a nervous illness, the power of perceiving visual objects, although the sensibility had scarcely suffered at all. Every time that he returned to his birthplace, it seemed strange to him; he could not at once recognize his wife and children, on one occasion not even himself when he looked in the glass.[1] In some very instructive states of disease, the power of understanding (of perceiving) spoken or written words is lost, without sight or hearing having suffered. The path from the concept to the word is unimpaired, although the path from the word to the concept is closed. Kussmaul[2] calls this malady word-blindness or word-deafness. Later inquiries into the physiology of the brain seem to show that sensation and perception are attached to different nerve-centres. While sensation seems to be possible even in an animal deprived of the cerebrum (as when a pigeon thus mutilated turns its head towards the light), perception can take place only when the cerebrum is intact. After extensive injury to the occipital lobes, a dog no longer understands what he sees and hears. He pays no attention when threatened with the whip, passes indifferently by his food, does not listen when he is called, etc. Dogs in this state are, as Munk expresses it, *soul-blind and soul-deaf*, that is to say, they have lost the power of combining sensations with the corresponding reproductions,—have thus partially lost perception, while sensation is unimpaired. They have gone back to the state of earliest youth, and must learn afresh to hear and see (*i.e.* to perceive) (*cf.* II. 4 *e*).

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[1] [In a series of recent articles, "Ueber Wiederkennen, Association und psychische Activität" (*Vierteljahrsschrift f. wissenschaft. Philosophie*, xiii. 4, xiv. 1, 2, 3) Prof. Höffding elucidates further this process of immediate recognition, and its place in association. *Cf.* also Dr. Ward's recognition of the same process under the name assimilation (*Ency. Brit.*, vol. xx., Art. "Psychology," pp. 52, 60), quoted by Prof. Höffding in Art. 1, p. 437. The two writers differ, however, on the point of (free) association by similarity. (Tr.)]

The word perception is here employed in the sense given to it by some English writers.[3] Sibbern appears, although he does not express himself quite plainly, to distinguish similarly between mere sensation and perception.[4] Other writers understand by perception a process more complex and comprehensive than that just described. Helmholtz, *e.g.*, understands by *sensations* the impressions on our senses in so far as they come into consciousness merely as states of the body (especially of the nervous system); by *percepts* he understands the same impressions, in so far as we form out of them ideas of external objects.[1] In reply to this it must be observed, in the first place, that our immediate sensations are not from the first presented to us as states of the body or of the nervous system; we have at first no notion that we have a body, not to mention a nervous system, and the knowledge of our body is only gradually acquired by means of sensations. Besides, with the proposed use of terms, no word would be left for the simple psychological operation, by which a sensation is brought into relation with a previous similar sensation. This act does not involve any consciousness of the external origin of the sensation; it may occur, moreover, in subjective sensations and feelings just as well as in those that owe their origin to external impressions.

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[1] *Hospitalstidende* ("Hospital Journal") (Copenhagen, September 5, 1883).

[2] *Die Störungen der Sprache* ("Lingual Affections"), p. 174, *seq.*

[3] Sir William Hamilton (*Lectures on Metaphysics*, xxvii.). Herbert Spencer (*Pr. of Psychology*, § 353). [*Cf.* Sully, *Outlines of Psychology*, p. 147. (Tr.)]

[4] *Psychologie*, p. 50.

2. Not only single sensations, but also whole series or groups of sensations, can be repeated and recognized. We then have a *complex percept*, and in reality nearly all our sensuous percepts are complex, because as a rule several sensations occur at the same time. In complex percepts, the content is arranged partly in the form of time, partly in the forms of both time and space. The closer examination of the conception of time and space must, however, be postponed to the next section (C). Here, on the other hand, we shall inquire how the memory and the representations pass from the *implicate* to the *free* state. This transition would not be possible if we had only absolutely simple percepts. Were the sensation A to be repeated and fused with the idea a, the process would then be at an end. But when a series or group of sensations $(A + B + C + D)$ has frequently recurred, then, when A afterwards appears by itself, the representations b, c, and d, as well as the representation a, have a tendency to re-emerge. Now only a can completely fuse with A; b, c, and d, in so far as they are not suppressed, must appear as something different from the given sensation (A), and consequently as independent parts or factors of the conscious-content. They thus become free ideas or representations.

Let the object of a complex percept be, *e.g.*, an apple. That I perceive an apple means that I have, together or in immediate succession, the sensations of colour (A), smell (B), taste (C), hardness (D), etc., which I recognize in their given combination. If now the same sensation of colour recurs, it (A) is not only itself recognized (through the implicate representation a), but also rouses representations of the other properties (b, c, and d). I *see* only the red colour behind the leaves but believe what I see to be an apple, because I involuntarily supplement the percept ($A + a$) with the notion of the other properties of the apple. A child, who has burned himself (B) at the fire (A), has the idea of pain (b) when next he sees the fire ($A + a$), although no pain is present at the moment.

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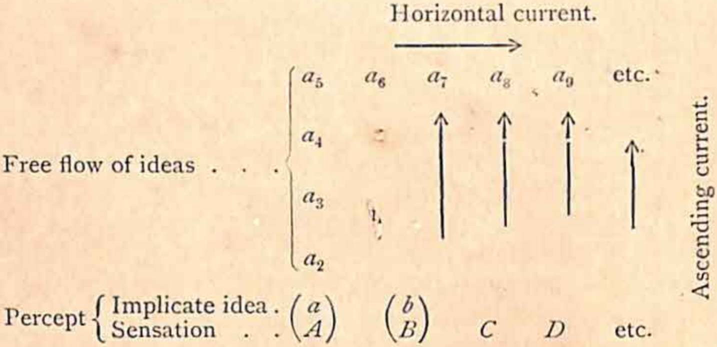
[1] *Die Lehre von den Tonempfindungen*, 1st ed. (Brunswick, 1863), p. 101. *Cf.* 4th ed. p. 6. [In Ellis' translation of an intermediate edition, see p. 9. Tr.]

The more numerous the free representations that arise in this way, the more there is formed in consciousness an independent field of ideas, a world of memory, which confronts with a certain independence the sensations and percepts of the moment. Immediate sensations then play often a merely subordinate part and act only as liberating forces. When we read a book, the paper and the black characters scarcely attain to express consciousness, but are lost in the ideas and feelings which—at first through many intermediate links—they set in motion. Consciousness has now at its disposal a content, which makes it to a certain extent independent of the influences of the moment; a life may be passed in memory, a life of thought, not merely a life of sensation or perception. The world of ideas has been strikingly compared to the blood. In the blood, which is formed out of nutritive matter derived from the external world, the organism has an internal world (*milieu intérieur*, *cf.* II. 3), which makes it to some extent independent of the external world. Similarly consciousness has in its free ideas an internal medium, which is formed out of previous sensations, and which makes it capable of leading its own life, even when the supply of fresh sensations fails.

We cannot of course completely isolate ourselves from the external world. Sensations are received at every instant, even when we are principally occupied with free ideas. Even in sleep we receive sense-impressions. And every sensation has a tendency to arouse implicate, as well as free, representations. So that there are always two streams in consciousness, of which now one prevails, and now the other. The one is determined by the sensation present at the moment and by the ideas which it tends to excite, the other is composed of the series of free ideas, which have been aroused by a previous sensation and which will be continued for several instants. The one might be called the ascending, and the other the horizontal, current, and the relation between them represented thus :—



Here A has set in motion a series of free ideas, which have so forcibly arrested the attention that they persist not only for one moment, (a . . . a_5) but for several (a_5 . . . a_9), and that the succeeding sensations (B, C, D, etc.), are unable to break the series by the ideas which they in their turn tend to excite. Perhaps they may not even be all recognized; in the schema we have given, only B is recognized, while C and D stir merely in the periphery of consciousness.—I may be, *e.g.*, on a steamer and sailing along the coast. I see the woods, hear the splash of the water, note the sighing of the wind, am aware of the conversation of the people round me, etc. Now the sight of the woods, *e.g.*, may set in motion a series of free ideas. I may think of one spot in it which especially pleases me; from that I pass to the idea of similar spots; a forest landscape of Ruisdael's occurs to me: where did I see it, in Paris or in Dresden? In Dresden I saw also Raphael's Madonna—during the course of this series of ideas (a_2 . . . a_9) the water continues to splash, the wind to sigh, the company to converse (B, C, D . . .), without any one of the sensations and percepts which they occasion succeeding in interrupting the horizontal stream.

In other cases we abandon ourselves to the immediate sensations, as when we listen to music and try to keep out all ideas, so that every moment we may fully and perfectly take in the fresh sensations of sound. In this case no horizontal current is formed. Rigorous musicians even demand that names shall not be given to musical compositions, to avoid the suggestion of a dominant set of ideas which might weaken the effect of the immediate sensations.—When we take a walk for the purpose of mental enjoyment and recreation, we yield ourselves to disconnected and changing impressions (light, clouds, trees, men, etc.), and permit each to rouse an ascending current, until succeeded by a fresh one. The alternation of dream-images is to be similarly explained. The schema for such cases would be :—

$$\begin{array}{ccc} a_2 & b_2 & c_2 \\ \binom{a}{A} & \binom{b}{B} & \binom{c}{C} \end{array}$$

Between a_2, b_2, c_2 . . . there is no connection ; a_2 is interrupted by B, b_2 by C, and so forth.

3. Between the two currents, the course of the free ideas and the series of the actual percepts, and also between the two elements in perception, the sensation and the implicate idea, there is an inverse ratio. They endeavour to check and to suppress one another. The more energy the one element claims, the less from the nature of the case remains for the other. Both elements and both currents are present in every state of consciousness, but with different degrees of strength. If they are equally strong, a rhythmical alternation occurs, so that now the sensation, now the representation, has the upper hand. They do battle for the attention ; but equilibrium between them would presuppose that they could both be presented with equal clearness to consciousness,—a thing which is impossible, for consciousness, like the point of most distinct vision in the retina, is always concentrated in one special direction. In some moments we are almost wholly under the control of sensations and percepts, in others buried in ourselves in reflection and deep thought, when the many sensations and percepts disappear in a single, often narrow but brilliantly illuminated, current of ideas. The difference between the two elements in perception appears in the fact, that the colours of a landscape seem fresher when we look at it with the head turned round. Spencer is doubtless correct in giving as the explanation, that the act of recognition is more easily excluded because of the unwonted position, so that consciousness, instead of explaining the sensations, is wholly occupied with taking them in as vividly as possible.[1]

As the relation between the two currents and between the two elements of perception is different in the same individual at different times, so too is it different in different individuals. The bent of some is to give themselves up wholly to the play of sensations (musical and artistic natures); for others sensations are of value only in so far as they may be recognized and classified (observers, naturalists); while others again live mainly in free ideas, in memory, in imagination, or in abstract thought.

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[1] Kant had already seen the inverse ratio of sensation to perception (*Anthropologie*, § 19). Attention has since been called to it by Fries (*Psychische Anthropologie*), i. p. 96, ii. p. 30, and by William Hamilton (*Discussions on Philos.*), p. 63; Spencer, in an interesting chapter (*Principles of Psychology*, pt. vi. ch. 18), has described the relation with most exactness.

The complex nature of perception affords an important contribution to the determination of the relation between sensuous perception and thought. Since perception rests on a process which may be described as involuntary comparison, it manifests itself as an activity of thought, by means of which we appropriate what is given in the sensation, incorporate the sensation into the content of our consciousness. If, then, an activity of thought is manifested in sensuous perception, it is evident that sensuous perception and thought cannot be two wholly distinct activities of consciousness. There is no such thing as absolutely passive sensuous perception. What is received into consciousness is at once worked up in accordance with the laws of consciousness.

Kant first demonstrated clearly the importance of reproduction, of memory, for sensuous perception. In the activity by which the varied matter given in sensation is appropriated ("apprehended"), are connected, according to Kant, sensuous perception and understanding, the two "extremes" of our knowledge.[1] Earlier psychologists either distinguished sharply between perception and thought as two absolutely distinct functions (Plato), or else conceived perception as obscure thought (Leibniz), or thought as transformed perception (Condillac).

4. The question here obtrudes itself, How does the free flow of ideas come to be recognised by consciousness as distinct from the actual percepts? We cannot ascribe to consciousness an original knowledge of this distinction. There is, indeed, as a rule a difference in the degree of strength of a memory-image and a percept; but this difference may be very small, and may even quite disappear. In any case, the first time that a present impression calls out the image of earlier memories, we cannot know what the difference of strength signifies. It may cause greater attention to be paid to the actual impression than to the remembered image; but in this there would be nothing to prevent the latter from seeming equally real.

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[1] *Kritik der reinen Vernunft*, (Kehrbach's Ausgabe), pp. 130 and 134 [Max Müller's trans., pp. 105, 109]; Berkeley, in his *Theory of Vision*, had already pointed out the complex character of perception.

It must be with dawning consciousness as with dream-consciousness: all that offers is at first taken for current coin, and no grounds are present for arranging the content of consciousness in two different spheres, in the world of possibility and imagination on the one hand, and the world of reality and perception on the other. On the contrary, this contrast is discovered only through experiences in great measure bitter. We must often run our head against reality, before it becomes clear to us where its limits lie.

Let us take as our starting point an exclusive sensation such as that mentioned by Condillac. Every fresh element of consciousness that comes into effect by the side of the given sensation, will have an overwhelming tendency to fuse, wherever it can, with this sensation, and in any case there will be as slight a change as possible, since otherwise the energy and interest would be divided. Now this has the further consequence, that the sensation or percept present will cast its own strong and clear light on the less strongly emerging elements, consequently on the memory-images which it awakens and which are closely connected with it. By association with the real impression, through which they are again called up, the memory-representations will receive the impress of reality, even when they are not naturally so distinct as the impression. In this way what is given is involuntarily supplemented and extended, so long as no distinctly contradictory experiences are known. Without such supplement we should not be able to "see" an apple, for the visual sensation does not give us all, but only one of, the properties of the apple; the others we supply in such a way that we believe them to be apprehended in the perception of the visual properties. In a percept of this kind the representative elements are thus far more numerous than the presentative, but they receive from these latter a stamp of reality which they would not have of themselves.

This power, which the present impression exercises, owes its origin not to the strength of the sensation alone, but also to the active support of all the sensory and motor organs. The primitive impulse to movement, from the nature of the case, is turned principally in the direction suggested by the given sensations. These obtain, in consequence, an effect far beyond that proper to their own strength and efficacy. On this account Bain has, with justice, given the orginal motor-impulse as an important cause of the primitive credulity of consciousness.[1] We stand ready, as it were, to start off at the first signal, and when we have once started it takes a great deal to change the direction. So long as we are not restrained we entertain no suspicion. An animal follows the scent of his prey, and only when the trap closes over him does it appear that one and the same sensation does not always lead to the same set of circumstances. In instinct there operates an impulse to movement which may often lead astray, as when bees and wasps fly to the flowers in a carpet, or when insects lay their eggs in the carrion-plant on account of its smell. Many animals will hatch any kind of eggs placed under them, or rear the young of other animals; thus a hen has been induced to brood over young weasels, and a cat suckled young rats in the place of the kittens it had lost.[1] A child puts everything he gets hold of into his mouth and sucks it, sometimes sustaining in consequence bitter disappointments. He learns that there are more things and relations than are dreamed of in his simple philosophy. He is thrust back, after his first sanguine attack on reality.

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[1] *Mental Science*, p. 377. (Tr.)]

There is more reason to speak of "unconscious judgments" here than in immediate sensations. Logically formulated, it is a positive conclusion "in the second figure," which the early consciousness draws, and through which it makes experiments, which often painfully endorse Aristotle's caution against this description of judgment. *A* is *C*, *B* is *C*—from this is drawn the conclusion that *A* must be *B*. But a finger or a baby's bottle cannot, because it has something in common with the breast, in every respect take the place of this. Not every smiling countenance is a promise that food or play will follow. Because the sheep willingly eats the leaves offered it, it does not follow that a bird will do the same. A small boy once made the direct assertion, "snow is sugar, for snow is white and so is sugar." The sight of white calls up the remembrance of sweet, and this association of whiteness and sweetness prevails at first in consciousness; then experience pitilessly sunders it, with the result that the idea of sweetness receives a special stamp, enters as it were into a special corner of consciousness, to which are gradually referred a whole series of other ideas which have undergone the same treatment (the idea of play in connection with a smiling face, or the capacity for eating grass in connection with the nature of an animal, etc.). In other words: *the first basis is laid of the contrast between possibility and reality.* Then only the *free ideas* enter into a relation of definite contrast to sensation and percept. The primitive confidence is destroyed.

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[1] *Cf.* Romanes, *Mental Evolution in Animals* (London, 1883), pp. 167, 218, *seq.* I may take a further example from Lyell's *Journeys in North America.* From the mines at the summit of the Lehigh the coals are sent down in a railway impelled by its own weight. Mules are employed to draw the empty wagons up every day, and in the evening are sent down again and allowed to enjoy their food by the way, The same mules, if employed in other tasks, are quite willing to draw heavy loads *uphill*, but obstinately refuse to take a cart *downhill*, make a halt at the slightest decline, and are not to be stirred from the spot.

The same facts exert an influence upon the state immediately present during the real impression. The representations called up by this impression no longer blend so closely with it. A certain doubt and a certain disquiet make themselves felt; the state is not so closed in and homogeneous as at first. The representation of that which on former occasions appeared as accompanying or succeeding the impression, is no longer the object of perfect conviction. If the child has learnt that satisfaction does not always succeed hunger, there arises in his consciousness a sense of contrast between his present feeling of discomfort and the idea of the satisfaction of the need. Previously the two intermingled; the transition from the one state to the other was continuous. Now, on the contrary, there is as it were a certain vibration in the ideas associated with the percept present. They are not one with it in the part they play, nor do they aim at the same effect.

If by memory is understood not only the power of reproducing and recognizing elements of consciousness, but also *the power of becoming conscious that the elements reproduced were experienced in time past*, then it is developed later than expectation and hope. At first we attribute to our ideas a practical bearing on the present and immediate future, and it is only when constrained by experience that we recognize their content as something completely past. When free representations have lost their stamp of reality, they often disappear with it; a certain mental development is implied in preserving and dwelling upon representations which can never again become percepts.

In this process it is of course also of importance whether the percept answering to the representation had usually been experienced before or after the present percept. Every state of consciousness has as it were two poles: through the one it is associated with the preceding, through the other with the succeeding element of consciousness (thus B is connected through a with A, through γ with C). Now if C recalls B, B will be situated *before* it in the series, since in this case the pole γ first emerges in consciousness. If, on the other hand, A recalls B, B will be situated *behind* A, since the pole α first rises up. The hungry child is quieted by being taken on the arm (A), because this is the first step (α) to satisfaction (B); C comes to be situated, as of itself, behind A in the series.

This theory,[1] which of course employs metaphorical expressions, brings out momenta of importance, though only in a secondary, supplementary connection. The chief cause of the separation between hope and memory is the same as the cause of the definite contrast between percept and idea—experience, namely, and the disappointments which it brings. This separation is aided, but not actually effected, by the definite place which the percepts usually occupy in relation to one another. By reason of our practical and sanguine nature, a *progressive* reproduction is at first the most natural. B will have the tendency to rouse the idea of C, but a lesser tendency to rouse the idea of A. The sight of a table being laid excites in a hungry man the idea of a meal; but the sight of a meal will not, on the other hand, except for some special reason, produce the idea of the table being laid. At the lowest stages of consciousness regressive reproduction does not apparently take place. Life struggles forward, and is only moved to look back by experiencing check. So that when a percept (C) chances to give rise to the idea of its predecessor (B), this latter will at first be frequently presented, not as predecessor but as successor, and expectation will arise. Only when experience has exercised its refining influence, can the distinction between α and γ become of significance; previously the distinction, under the influence of the impulse to movement and of confidence, will be overlooked.

Even apart from the practical tendency, progressive reproduction is the most natural. Psychologically, it is not a matter of indifference whether we pass from A to B or from B to A; we experience the two transitions as different, often as quite opposed. The change from light to darkness is thoroughly opposed to that from darkness to light; this is still more strikingly the case with the change from pleasure to pain, and from pain to pleasure. Even when the contrast is less strong, it is still the case that a different arrangement gives different sensations. The order of the dishes at a feast is gastronomically not at all indifferent. When we reproduce backwards, we really, to be exact, reproduce something other than what we have experienced; thus in psychology the order of the addenda is not indifferent. It follows that regressive reproduction cannot be so deeply implanted in us as progressive, but presupposes a more advanced development.

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[1] It is found suggested in Robert Zimmermann, *Philos. Propædeutik*, 3rd. ed. p. 223; developed by Taine, *De l'Intelligence*, livre iii. chap. 7 and 9; *cf.* also James Sully, *Belief, its Varieties and its Conditions* (Sensation and Intuition) (London, 1874,) p. 80 *seq.*

From this exposition we see how far from possible it is in reality to carry through the abstraction of the cognitive from the other kinds of conscious elements. And yet we are here ignoring many questions which may be thrown out as to the influence of feeling and will on the course of development above described; these belong to a later section of our inquiries.

The examples we have employed were taken from primitive and elementary stages. But it will be easily seen that the same process repeats itself, wherever experience exercises its corrective influence on over-confident and pre-conceived opinions and hopes. This is a fiery test which every endeavour, theoretical and practical, has to undergo. The scientific methods of experiment have grown out of the psychological process just described. Every experiment consists in taking the consequences of certain definite hypotheses and so testing these hypotheses; and to such experiments life constrains us from the first instant.

There is still something wanting to give consciousness perfect clearness. We have distinguished between elementary, implicate, and free memory, and have tried to show how free memory emancipates itself from perception and expectation. But with this free memory may be further combined the definite consciousness, that the representation had its origin in an earlier time. The idea of time and its development will be treated in the next section. Here it is only to be observed, that *this definite reference of the representation to a definite point in time* affords a main point of distinction between memory and free imagination. Imagination alters the content and the combinations of ideas, and creates new arrangements and groups, while memory proper follows step by step the order of the actual percepts. In remembrance as opposed to creative imagination, a recognition, a perception, takes effect among the free ideas. I can *recognize* (*perceive*) *a free idea*, just as much as I can recognize a sensation. The recognition of an idea implies that I have had before, either the idea itself as a free idea, or the sensation answering to it.

5. We have already, in the first chapters of these inquiries (I. 4 and II. 5), found in memory and in the close, and in our experience the only, way in which different elements are through it

combined into a unity, a typical expression of the nature of consciousness. My act of remembering takes place at the present moment, but that which I remember pertains to an earlier moment. In the unity which embraces and holds together the different sensations and ideas, and makes their interaction possible, lies the germ of the *conception of the ego or self*. This conception has therefore as deep a basis as a psychological conception can have, since it expresses the actual fundamental form and fundamental condition of conscious life. The difficulties which have been found in it are due in great measure to the fact that the ego has been looked for as something absolutely simple, which might consequently be given in a certain definite state, in a certain definite sensation or idea.

If we start with the assumption that the ego proper must make its appearance as a single element of consciousness, in contrast to other elements of consciousness, it is no wonder that it is looked for in vain. Thus Hume, in trying to prove that the idea of self is contrary to experience, says: "If any impression gives rise to the idea of self, that impression must continue invariably the same, through the whole course of our lives; since self is supposed to exist after that manner. But there is no impression constant and invariable. Pleasure and pain, grief and joy, passions and sensations succeed each other, and never all exist at the same time. It cannot, therefore, be from any of these impressions, or from any other, that the idea of self is derived; and consequently there is no such idea. . . . For my part, when I enter most intimately into what I call *myself*, I always stumble on some particular perception[1] or other, of heat or cold, light or shade, love or hatred, pain or pleasure. I never can catch *myself* at any time without a perception, and never can observe anything but the perception."[2] In this Hume was perfectly right. But he searches in the wrong place. The nature of the ego is manifested in the *combination* of the sensations, ideas, and feelings, and in the forms and laws of this combination, consequently in memory and comparison, from their purely elementary and automatic forms up to the highest and clearest forms which they are capable of taking. Hume cannot see the wood for the trees. His polemic holds good as against the spiritualistic conception of the "soul" as an individual substance, separated off behind the several elements of consciousness. But he offends against actual psychological experience, when he declares mockingly that, "setting aside some few metaphysicians," the rest of mankind are nothing but bundles or collections of perceptions, which succeed each other with inconceivable rapidity, and in a constant current. He overlooks the inner link between these conscious elements, which enables them to become elements of one and the same consciousness and not of several consciousnesses. And yet he must of course have been led to ask, what holds the conscious elements together and makes them into a "bundle"? To this end there must be a combining force; but with Hume this force was entirely lost sight of for the individual members of the bundle. He even went so far as to attribute independent or substantial existence to the individual percepts. It remained for him therefore an insoluble problem, to account for a combination among "perceptions," each of which exists independently. "I must confess," so he concludes the chapter quoted of the "Treatise," "that this difficulty is too hard for my understanding." And this much is certain, that if the individual elements of consciousness are first represented as quite independent, it will be found impossible to bridge them together.[1]

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[1] The expression Hume uses here (perception) includes for him both impression and idea.

[2] *Treatise on Human Nature*, vol. i. pt. iv. section 6.

The assumption from which Hume set out in his criticism, namely, that the ego must make its appearance as a single element of consciousness, is even a contradiction in terms. If the ego and *a single* element of consciousness (sensation, idea, or feeling)—even though this element were quite constant—were absolutely coextensive, all other sensations, ideas and feelings would fall, in all cases where they could not wholly fuse with this constant element, outside the ego, and how could we then *have* them? For to the ego must pertain everything that is in consciousness, and it cannot therefore be exhausted in a constant feeling or in the dominant mass of ideas. The ego must be present in the weak as well as in the dominant feelings, in the ideas which attain only to the periphery of consciousness, as well as in those which gather round its centre. It is just the ego, as the expression for the unity of consciousness, which makes interaction possible between the dominant and the weaker feelings, between the central and the peripheral ideas. We distinguish—often a little Pharisaically—between our "real self" and the casual, momentary and transitory thoughts and feelings; regarded psychologically, the self embraces both the one and the other.

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[1] Stuart Mill, who in his earlier writings expressed his views as to the basis of the conception "self," with some indecision, seems from what he says in the fourth edition of his *Examination of Hamilton* to have ultimately broken definitely with this view of Hume's.

We must admit that the idea of self cannot be derived from immediate perception, but must be obtained by inference from the general nature and conditions of conscious life. This is a necessary consequence of the fact that it is based on an activity, always (*i.e.* so long as consciousness lasts) continued and repeated ; on the synthetic activity which all consciousness presupposes. In each individual state we have the product of this activity, but not the activity itself. It is a fact connected with this, that *we can never be fully conscious of ourselves.* For the very state in which we think of our self, is conditioned by synthesis ; self-consciousness, just as every other kind of consciousness, is possible only by its means. The synthesis, the inner unity in us, always hides itself, however deeply we try to penetrate into consciousness ; it is the constant presupposition.

And we must admit further, that the unity, the synthesis, is not absolute, but always *relative* and *struggling.* This is apparent, and not least conspicuously, in the very beginning of conscious life, where absolutely scattered and isolated sensations and impulses seem to enter without any inner connection or unity. Some writers have even expressed the opinion that the unity of conscious life does not exist from the beginning. Their idea is that the mental life begins with sporadic and independent sensations, which are only gradually gathered together and brought into reciprocal combination.[1] Or else they attribute to the young child, several egos (a cerebral ego, spinal ego, and an ego for each of the central sensory-organs), which are afterwards merged.[2] The sporadic character of the primitive conscious life could not be expressed more strongly. But no psychological meaning can be given to the merging or growing together of several egos. Views such as those referred to rest upon physical or physiological analogies. Two heaps of sand may by combination form *one* heap, two organic cells may grow into *one* new cell. The merging or combining of two egos or consciousnesses into *one* ego, on the other hand, is a psychological absurdity. The synthesis of consciousness cannot arise from the mere combination of individual parts. It is just this which distinguishes mental from material connection, and precisely for this reason is the origin of consciousness so great a problem.

Hume was not, however, wholly mistaken in postulating a constant element of consciousness as the basis of the idea of self. For the unity which is expressed in memory and in synthesis, in the inner connection of consciousness, is in itself purely *formal*. It is the condition of *all* consciousness; but each individual consciousness has, besides this formal, a *real* unity. The form of consciousness is common to all conscious beings; *individuality* consists (in addition to the *degree of energy* with which the synthesis is effected) in the definite *content* which is embraced by the formal unity. And this content cannot change every instant. There must be a solid, dominant set of ideas and feelings, in and by which the individual may recognize himself; they need not absolutely fill every instant of life, but they must constantly recur. And in this connection feeling and will are manifestly of greater importance than sensations and ideas. The vital feeling (the feeling of pleasure and pain accompanying general sensation) with the moods, it induces, form a background, often overlooked but not the less important, which plays a greater part in our *real* self-consciousness than any idea or thought whatsoever. The said moods, though for the most part vague, yet lend a stamp and colour to the whole mental content. The more developed and energetic form of our self comes to the fore in our dominant aims, in our desire and our passion. No true personality is developed without a concentration of the life of feeling and will. A man who has no dominant feeling, but flies from one thing to another in a constant search for novelty, has not time and strength enough to gather himself together or to be himself; to know oneself is to *recognize* oneself, and this pre-supposes constantly recurrent elements of consciousness.

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[1] Vierordt, *Physiologie des Kindesalters* ("Physiology of Infancy"), pp. 157-169.

[2] Preyer, *Die Seele des Kindes*, p. 368, *seq.* (Trans. in Int. Educatl. Series, vol. ii. p. 203, *seq.*)

The formal unity can only to a certain degree persist without the real; if the contrasts within the content are too great, the mould will burst. In periods of fermentation or transition, contrasts and sudden changes are experienced even in healthy conscious life, estranging the individual from himself and threatening to destroy his unity. Thus at the age of puberty quite new feelings, new desires and wishes, make their appearance; the individual feels himself drawn out of himself. He no longer understands himself. This unquiet frame of mind, this bold soaring of the imagination makes him strange to himself. Mental maturity also, especially in deep natures, is attained through a similar fermentation. Different inspirations, ideas and impulses stir chaotically; mental growth often begins, like the formation of the bones, at scattered points. The sporadic character of development is only gradually overcome, and not completely in any individual. But the very fact that the inner division and fermentation and the inner doubt are *felt*, bears witness to a unity which embraces the scattered and contending elements. It is only because one and the same self is active in all opposing elements that their mutual relation comes into consciousness.

Even when the prevailing elements of consciousness are not the same throughout the whole of life, but different at different stages of development, the formal unity may still be preserved, if the transition from one standpoint to another is *continuous* and *consequent*. A mental revolution does not destroy the unity of the self if (like most revolutions) it is but the outcome of a process long carried on in secret.

On the other hand, the advancing dissolution of the real unity of the self does at last bring about the dissolution of the formal unity. The study of mental diseases exhibits four principal stages of such a process of dissolution.

Mental disease generally begins with a change in the vital feeling inexplicable to the patient himself. The way in which existence ordinarily affects him is interrupted, his accustomed mood is changed (generally in the direction of pain). The patient doubts his own existence, or regards his own person and everything which happens to him as at a great distance. Experience still forms a bridge between the old and the new feelings (otherwise the patient would not *feel estranged* from himself); but this bridge is insecure, because the fundamental inner experiences do not repeat themselves.

At a more advanced stage of mental disease, the patient is so far estranged from himself, that he attributes his earlier experiences, those previous to his illness, to another subject. He has not forgotten his past, but fails to recognize himself. He speaks of himself as of a third or a dead person, or maintains that he was deranged at that earlier time.

In some cases the conscious memory-connection may be lost periodically. This is the case in the so-called "*double consciousness*." Two states succeed one another, and the individual appears to be a different person in each. Character, memory and disposition are different in the two states. Knowledge which the patient possesses in the one state is forgotten in the other. Sometimes the patient may be conscious of the distinction between his "old" and "new" state. In other cases, when such consciousness is no longer possible, memories from the past still take effect as an obscure under-current. After a nervous shock, occasioned by an escape from drowning, a lady lost several of her senses, the power of speech and all distinct remembrances, but always became exceedingly agitated at the sight of water, even in a picture. Here the continuity with the earlier state was, so to speak, underground.—A similar underground connection takes effect, when a person who has received an order when hypnotized, executes it when awake at the appointed time, without being able to say why he does it.

But when all the different states and periods are wanting in common elements, then the end is approaching. Repetition of the stimulus is then useless, since the power of reproduction and comparison is lost. Conscious life is then in complete dissolution.[1]

6. As has already been observed (III. 1, 11-12), sensations, looked at *psychologically*, arise out of nothing. They are the primitive elements out of which conscious life is woven, but their explanation cannot be found within this web, if indeed it can be found at all. Ideas in their simplest form are reproduced or recalled sensations. But since we distinguish between ideation and continued sensation, and since an interval intervenes between the original sensation and the idea in which it is renewed, the question arises, whence come the ideas? Do they emerge from a psychological nothing, or do they carry on an existence below the threshold of consciousness?—What may be said hypothetically in answer to this question, in connection with the general problem of the relation of the unconscious to the conscious, we know already (see III.). We cannot help thinking that ideas we have had have a closer relation to our consciousness than those which have never appeared in it. There is, moreover, the wonderful circumstance that ideas, when they re-emerge, may have undergone changes, have been re-grouped or blended. The preservation of ideas, although they are not always in consciousness, as well as that elaboration of them in which consciousness takes no part, justifies us in attributing a positive value to the conception of unconscious mental activity, in spite of all the difficulties attending the application of the law of the persistence of energy to the mental world. When traces, residues, or dispositions are spoken of as remaining after sensations and ideas have disappeared from consciousness, there is

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[1] *Cf.* with the phenomena described, Taine in the *Revue Philosophique*, i. 289, *seq.* (taken from Krishaber); Griesinger, *Die Pathologie und Therapie der psychischen Zustände* ("The Pathology and Therapeutics of the Psychical States") 2nd ed. pp. 334-341; Ribot, *Les Maladies de la Mémoire*, p. 86, *seq.*; Richet, *L'Homme et l'Intelligence* (Paris, 1884), pp. 243, 249, *seq.*

involved just this assumption, that there must be something in the mental world analogous to the persistence of energy in material nature. There is, however, this difference between material and mental nature, that, while in the former we can point to potential energy as a definitely given state of equilibrium, in the mental world nothing corresponding to this is possible. (*Cf.* II. 2 and 8.) Physiologically, there is no real difficulty, for in itself it is easy to understand that a cerebral process may arise of the same kind as one which occurred on a previous occasion, and that it will take place more easily the oftener it is repeated and practised. It is possible to represent the molecules concerned as so disposed upon repetition, that their equilibrium is more easily disturbed. But we cannot form any image which would serve to illustrate the meaning of mental tension (potential energy).

The reason for recurring to this observation is, that the theory above criticised, of the independence of ideas, has led to a peculiar conception of the retention of ideas. Some psychologists (of Herbart's school especially) hold that the faithful and constant retention of ideas is the rule, the forgetting of them the exception. The problem would thus be, to explain not remembrance but obliviscence. Every idea would then be supposed to have a tendency to self-preservation, to the maintenance of its existence in consciousness, a tendency checked only by the appearance of other ideas with the same tendency. One idea would therefore be easily driven out of consciousness by other ideas; but so soon as these disappeared, it would reappear of itself, without requiring any help or any motive, just as a watch-spring flies back when the pressure is withdrawn. A distinction will consequently be made between two kinds of reproduction, the immediate reappearance of an idea by virtue of its own force so soon as the hindrances are cleared out of the way, and the mediate recall of an idea into consciousness by means of its connection with other ideas. An immediate reproduction occurs, *e.g.* after sleep, when the ideas of the preceding day present themselves, as soon as the hindering influence of sleepiness passes off. Even when an idea seems to be quite forgotten, it may not be supposed to have wholly disappeared; it remains below the "threshold" of consciousness, and may make its appearance again when occasion serves. Memories, the existence of which was quite unsuspected, may arise again at the sight of the surroundings in which their content was experienced. In old age and shortly before death the memories of youth may be awakened, and long-forgotten ideas make themselves felt. Great sorrow may recall the past more clearly to memory. It is also known from various remarkable accounts of illnesses, that in fever and other pathological states, the patient will speak of things and utter words which he does not remember at all in his healthy state, a circumstance which can be explained only by the supposition that ideas previously overlooked obtain under these abnormal circumstances an opportunity of obtruding themselves.[1]

It is self-evident that we cannot pronounce any idea to have entirely disappeared out of consciousness. We do not know all the threads by which the individual, to all appearance casual and isolated idea may be united to other elements of consciousness. The union between a certain feeling or a certain general sensation and a certain idea is here of special significance; if the feeling or the general sensation is repeated, the idea may appear as "of itself." The close connection of the conscious with the unconscious mental life, makes it possible, besides, for that which appears isolated so long as we confine ourselves to clear consciousness, to have its underground connection. This is why our knowledge of ourselves is often so purely empirical; we frequently discover a connection existing between certain ideas and feelings, without being able to trace the connecting links. Thoughts emerge, feelings come into play, the previous history of which is unknown to us, although it must have been concerned in our experiences. Thus we may often discover in ourselves something of the existence of which we had no suspicion.

It does not, however, follow that single ideas have a sort of individual immortality. The independence of the single idea is due only to the fact that it is a special form of the ideational activity, that it marks one of the paths which mental activity takes under certain definite circumstances. When conscious life has received new force through sleep, it is quite natural that it should first and with greatest ease take the accustomed course. Our constant line of thought is to our conscious life what the type is to the organism, the form under which in ordinary circumstances development proceeds, and out of which it can be turned only after a certain resistance. The emphasis is not, then, to be laid on the single ideas as such, but on the general activity of consciousness. No individual idea is preserved and recalled, unless the conditions for the general course of conscious life bring it in their train. There is here, as it were, an inner mental system of nature, which underlies the individual manifestations of life. The single ideas may very well help to determine the further development of conscious life, without being themselves retained. In reality, then, it is the conditions of the *retention* of ideas, into which psychology must inquire. The Herbartian psychology introduces anarchy into conscious life, in attributing to the individual ideas imperishable existence. Consciousness is not merely a platform on which ideas carry on their struggle for existence, it acts itself in and through the individual ideas.

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[1] Some special instances are quoted by Carpenter, *Mental Physiology*, pp. 436-439. After the use of opium also, long forgotten memories may suddenly emerge. Thus De Quincey relates (*Confessions of an Opium-eater*) that "the minutest incidents of childhood, or forgotten scenes of later years, were often revived; I could not be said to recollect them; for if I had been told of them when waking, I should not have been able to acknowledge them as parts of my past experience. But placed as they were before me, in dreams like intuitions, and clothed in all their evanescent circumstances and accompanying feelings, I recognized them instantaneously."

It accords with this, that we learn to remember, not so much by impressing each of the individual ideas as by taking note of their combination and connection. The greater the rational connection among ideas, the more easily will they be preserved.

7*a*. *The free memory-image* is distinct not only from the immediate percept and from the immediate after-effects of sensations (*after-images*, *after-sounds*, *etc.*), but also from certain representations which emerge without external cause,—the so-called *hallucinations*. Hallucinations enter, like percepts, with the mark of reality, and it is often difficult, if not impossible, for an individual to distinguish them from actual percepts. In this respect there are many differences of degree. While one mentally deranged will obstinately maintain the reality of his hallucinations, there are other cases where the individual knows clearly that what he sees are mere phantoms. A man, of whom Bonnet[1] tells us, used to see from time to time, without the smallest external cause, men, women, birds, carriages, buildings, etc. These figures moved, grew or decreased in size. Sometimes all the walls of his room seemed to be hung with landscapes. All these made as strong an impression on him as if they had been real objects. And yet he did not mistake these appearances for realities; at any rate he was always able "to correct his first judgment." They were to him like a play, of which he was a spectator, not knowing what scene the next instant would bring.—This stamp of involuntariness and externality (exteriority) brings the hallucination, as also the *dream-image*, close to the sensuous percept. The physiological process in the dream-image is indeed partly the same as in hallucinations, namely the action of the altered condition of the blood on the sensory brain centres,[1] consequently an automatic stimulation, by which the brain is affected in the same way as in normal and waking states by impressions of the external world only. However, in dream-images the actual impressions received during sleep play so great a part (see III. 8), that the images may be classed rather with *illusions* than with hallucinations. By illusion is meant a mistaken subjective interpretation of an objective impression, as when a white towel in the moonshine is taken for a white figure, or wreckage on the coast for men. According to the schema we have already employed, an illusion is psychologically characterised by the fact that the implicate idea obtains the upperhand over the sensory element in the percept (a over A, so that a at once leads to b, c, d).[2]—This distinction between hallucination and illusion was first drawn by Esquirol.[3] There are, however, many intermediate forms, and since there must always be a minimum of sensuous impressions present, the difference is only one of degree.

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[1] *Essai analytique sur l'Âme* (Copenhagen, 1760), chap. 23.

The hallucination has this in common with the memory-image, that it is sometimes produced voluntarily. An English painter possessed the power of calling up the images of his sitters, even when they had sat to him for only half an hour, with as vivid colours and forms as the reality, so that he could paint from the images. From time to time he glanced from the painting to the imaginary person and compared the likeness. He ended, it is true, by losing the power of distinguishing imaginary persons from real, and had to spend thirty years in a lunatic asylum. But there may be a power not in the least of a pathological character, of creating images with the stamp of reality. Thus Goethe was able, when his eyes were closed and his head bent, to see a flower, out of which new flowers kept growing, for as long as he liked.[4]

Hallucinations are sometimes memory-images, which suddenly take on the stamp of reality. Their most startling and deceptive appearance is, however, when like actual percepts they suddenly interrupt the "horizontal" series of free ideas.

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[1] *Cf.* Wundt, *Physiol. Psychol.*, i. pp. 178-181. (3rd ed. i. pp. 194-197.)

[2] An illusion based on an hallucination is described by Benvenuto Cellini in his autobiography (2nd book, ch. 12). In his subterranean prison he had for a long while yearned and prayed for the sight of the sun, in a dream at the least. At last one morning he had a vision of the sun. But presently the disk of the sun changed into a golden disk, within which appeared Christ on the cross, and presently Mary and the child as embossed work. As Goethe has observed, his attitude to this visionary sun was that of an artificer in metal. Had his imagination been accustomed to move in a different direction, he would have made something quite different out of the same vision.

[3] *Des Maladies Mentales*, i. 2-3. [*Cf.* Sully, *Illusions*, p. 11 and footnote. (Tr.)]

[4] Brierre de Boismont, *Des Hallucinations*, pp. 27, 462.

As regards strength and vivacity, there is only a difference of degree between hallucinations and memory-images. In this respect there are great individual differences.[1] While in some people the memory-images are very vivid and highly coloured, in others they are without colour and vague in outline. In some people the memory-image approximates to a real percept or an hallucination. They see things as clearly and strongly in idea as they are in reality, so that the remembrance of the sun may even be dazzling. Others, on the contrary, declare that in memory they are not able to see any individual objects, but merely have indistinct and uncertain ideas of what has been seen; their memories are not vivid enough to deserve the name of images.—Not only natural endowment, but also age and exercise, are of importance in this connection. The memory-images are most vivid during childhood and youth. A child who had been absorbed in the memory of a person dear to him, said, "I have been dreaming." Poets, students of nature, and travellers have more vivid memory-images than students of abstract subjects. There is in general an opposition between power of imagination and abstract thought, similar in kind to that between real percepts and the course of free ideas, and between the two elements in perception (sensation and implicate representation) (see V. *B.* 2—3).

Those who have no individual and lively memory-images may yet have a good memory. They remember *the fact that* they have experienced something, although they cannot picture it in memory. Very strong sensations have indeed to be remembered in this way by every one. A shot from a cannon, a sudden blow or a flash of lightning is remembered indirectly rather than directly. Even colourless and feeble memories may very well be accurate, and serve perfectly to form the basis of a description and estimation of the thing experienced.

Memory is not equally easy and distinct in all the departments of sense. To those who have sight, visual memory is commonly the most important. The capacity of obtaining distinct ideas from the other senses is very differently developed in different individuals. The patient of Charcot, already mentioned, (1) possessed before his illness a quite extraordinary visual memory; this he lost during his illness, and after recovery a lively memory for sounds took its place. Many people have no knowledge whatever of representations of smells and tastes, and certainly very few people (possessing sight) have distinct motor-representations (corresponding to motor-presentations).[1] As Galton has shown, sharp sight and clear visual memory do not always go together; just as little are lively visual memory and great faculty of recognition necessarily combined.

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[1] *Cf.* Fechner, *Elemente der Psychophysik*, ii. pp. 469-491; Galton, *Statistics of Mental Imagery* ("Mind," 1880); also in *Inquiries into Human Faculty* (London, 1883), p. 83, *seq.*

As the illusion and the dream-image come between sensuous percept and hallucination, and very strong and lively memory-images approximate to hallucinations, so on another side there is an intermediate link between sensuous percept and memory-image, in what Fechner has called "*memory-after-images*."[2] This is a memory-image called up immediately after a sensuous impression, before its effect has ceased. Even persons who do not otherwise have lively and coloured memory-images, may in this way obtain them, at any rate for an instant. Their memory-faculty needs as it were the helping hand of actual sensation. Here again many individual differences are found. With some the after-image, with others the concentration of attention upon the after-image, plays the greatest part. After observing an object in ordinary daylight, Fechner received a complementary after-image; but when he concentrated his memory upon this image, it gave place to a memory-image with the natural colour of the object and without complementary after-effect.—Observations which I have made, show that even the after-image may be recalled. After looking at a window (dark cross on light ground) I received a negative after-image (light cross on dark ground). This disappeared gradually, but in the spot where it had vanished from the visual orbit of the closed eye, there remained a white spot of mist, and by concentrating attention on this mist, I recovered the after-image. This was properly, then, a *memory-after-image of an after-image*.—The further the memory-image is in point of time from the direct sensuous percept, the greater the difficulty with which it acquires a lively character.

b. With regard to the conditions most favourable to the preservation and rise of memory-images, three things must be specially noticed; the circumstances under which the original experiences take place, the circumstances during their reproduction, and finally the nature of the memories themselves.[1]

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[1] When the power of writing is lost (*agraphia*) without being accompanied by word-blindness or word-deafness, that is due to the loss of the motor-memories. Although the hand itself is all right, the power of recalling the movements which produce the letters is lacking. Such a case of "motor-agraphia" is mentioned in the *Hospitalstidende* (the Danish hospital journal), December 24, 1884.

[2] *Loc. cit.*, p. 491, *seq.*; Newton had already noted the phenomenon; Brewster, *Life of Newton*, i. p. 327.

Since memory has its physiological expression in the power of the organism to preserve traces of received impressions, it is self-evident that *the fresher and more energetic the general vital process* the better may things be learnt, *i.e.*, the sensuous percepts will leave behind more permanent and deeper traces. This is the reason why childhood and youth are the proper time for learning, and why what is learnt then is more easily preserved than the experiences of later years. In old age the events of childhood are consequently remembered better, while the events of later years and of quite recent occurrence fall into oblivion. "The glasses of an old man are cut so as to enable him to see what is near." The brain-process lacks the energy to preserve fresh impressions. This more speedy dissolution of later acquisitions is a general physiological law. (*Cf.* also IV. 4.)

Things we have learned and experienced in an unusually energetic and cheerful frame of mind are more easily retained than things we have taken in when enervated and out of humour. Increased vitality counts thus to the score of the newly apprehended elements of consciousness. In apoplectic and epileptic cases the same circumstance is sometimes found as in old age: while earlier memories are retained, the later ones are wiped out. When exhausted with fatigue, the mind is not in a position to collect material for memory.

Time and *repetition* are required, for memories to be firmly established. What is hastily taken in, is as a rule hastily lost. Actors who have learnt a part in a short space of time, do not remember it so well as a part properly got by heart. What in England is called cramming, does not produce the same thorough results as proper study. Connected with this is the remarkable fact that in pathological loss of memory the words first forgotten are those denoting concrete and individual objects, while names of abstract concepts and relations are remembered better. Proper names and nouns in general are therefore most frequently forgotten, and afterwords verbs, adjectives, and pronouns. Kussmaul[2] explains this by the fact that while we can easily picture to ourselves persons and things without the help of words, abstract notions and relations are only firmly established in consciousness by the help of words. And since in the cellular tissue of the cerebral cortex, certainly far more numerous processes and combinations are required to produce an abstract than a concrete concept, the organic links which connect the concept with its name must be far more numerous in the case of the abstract than of the concrete concept.

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[1] *Cf.* in connection with what follows: Spencer, *Principles of Psychology*, i. part ii. chaps. 5-6; Carpenter, *Mental Physiology*, p. 441, *seq.*; Ribot, *Les Maladies de la Mémoire* (Paris, 1881). [Also Ebbinghaus, *Memory Experiments*, "Mind," vol. x. p. 454. (Tr.)]

[2] *Die Störungen der Sprache* ("Affections of Speech"), pp. 163-165.

It might seem to contradict this, that so little is remembered of the very earliest years of childhood, when the brain must be at its freshest. Memory seldom indeed goes back beyond the third or fourth year. To account for this, Preyer observed, much to the point, that our earliest childish experiences are very different from those of later years.[1] What a child learns in his first year or so: to sit up, to walk, to speak, is a sort of self-contained course of training; when once he has passed through it, the road is opened to the wider experiences common to all adults. There is thus a want of continuity and harmony between the experiences of the earliest and those of later years, and as a rule therefore a want of interest in retaining those older events fresh in the memory.

Other causes may, however, be pointed out as conducing to this result. The earliest sensuous percepts have as yet a chaotic and sporadic character, are but little arranged and organized, and a certain definiteness and order is a condition, as will presently be shown, of the retention of experiences in consciousness. In the consciousness of the little child, the "ascending" current predominates, just as in dream-consciousness. And dreams are but seldom remembered. The cerebrum, with which the memory-activity is linked, plays generally but a small part during this period (see IV. 4). The impressions have a greater tendency to break out in reflex-movements, than to install themselves in memory.

(*c*) Just as a fresh and healthy brain is essential to the collecting of material for memory, so is it also a condition of the *reproduction* of this material that there should be sufficient energy in the organism, especially in the brain. Sir Henry Holland, an English physician, while visiting the mines in the Harz mountains, suddenly forgot his German in consequence of over-fatigue, and it returned to him only after he was rested and refreshed. In happy moods, especially in strong excitement, memories rise up which cannot be commanded under ordinary circumstances (*cf.* 6). The use of opium and similar drugs has sometimes the same effect. There must, besides, in some way or other, be something in the organic state and in the prevailing mood corresponding to the state and mood which were present during the actual experience; though in this connection contrast may sometimes be of great importance.

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[1] *Die Seele des Kindes*, p. 226. (Eng. trans., vol. ii. p. 9.)

Besides this, it is a question of what sensations press in upon us at the moment. The stronger the effect produced by these, the greater the difficulty with which the memory-images develop (see 2). The more closely they are related to the memory-images, the more will they interfere with the independent entrance of these. We may have memories of colours or sounds while touching an object, but hardly of red while experiencing blue, or of sounds different from those which we hear at the time.

(*d*) Not all that we experience is equally well suited to be remembered. The more simple and less complex it is, the more easily does it disappear. That which has many strongly marked and distinctive sides is better retained. On this account feelings and states of mind are, as we shall see in a later connection, remembered only through the ideas with which they are connected, and we recall the oscillations and transitions of feeling more easily than the feeling itself. The general sensations, the most obscure and inarticulate of our sensations, are thus not easily reproduced. We can remember the fact that under such and such circumstances we felt hungry or thirsty, but no memory-image is formed of the actual hunger or thirst. The higher senses, on the contrary, touch, hearing and sight, afford clear and distinct memory-images, and the world of memory, for those who can see, is certainly peopled chiefly by visual ideas. We remember relations better than the individual members of the relation, the form better than the content. Among forms again, those are best remembered which are most distinctly differentiated. Thus the space-relation is remembered better than the time-relation, and this better than the general relation of difference. Because of the ease with which it is retained, the space-relation is employed as the basis of so-called mnemonics, as a frame (*memoria localis*), which might contain and support all material for memory.

8. (*a*) When we yield ourselves up to the flow of ideas, the emerging images seem to come "of themselves" just as much as sensations. We have at any rate the feeling that they are as little produced by us as immediate excitations. The one as the other

must be accepted, as they are and as they come. Especially where there is a considerable contrast and difference between the emerging and the preceding ideas, is their appearance inexplicable. The effect then seems to bear no relation to the cause. If to this is added the suddenness with which ideas sometimes make their appearance, it is little wonder that many, who in the physical world will admit no break in the series of cause and effect, nevertheless hold the mental world to be subject to no invariable laws. We have already seen (III.) that the world of consciousness is not a self-contained whole; it becomes intelligible only on the assumption of an interaction between conscious and unconscious activity. Not all the conditions for the production of a mental state are given in the life of conscious ideation and feeling; unconscious, inherited or acquired dispositions and instincts often play the most important part, and the observer learns to know them only through their effects. The laws of the interaction of conscious ideas are thus only clues, which may serve to guide us when we try to understand the changes among the phenomena of consciousness, empirical rules by means of which we arrange the chaos of our experiences. But so far as we are in a position to establish these rules by the closer examination of psychological phenomena, we find corroborated the assumption of a causal connection, with which the student of the inner as of the outer world may start. And in so far as a phenomenon cannot be satisfactorily explained by these laws, we merely conclude, either that there must be laws which we do not know, or that the connection is too complex to admit of reduction to simple points of view.

(*b*) We have already, in what precedes, encountered the laws which govern the association of ideas. We have seen how a sensation fuses with the traces of earlier sensations (A with a), and how a firm and repeated combination of sensations (A, B, C, D) brings about also a firm combination of the corresponding representations (a, b, c, d), so namely, that when one of these is recalled it has a tendency to bring the others after it. In the *growth of sensuous perception and in the freeing of ideas* the same laws are at work as in the *association of free ideas*. The difference is this, that in the latter case, the individual members are known to us as independent elements of consciousness before the association takes place, while in the association between sensations and implicate ideas we know only the product. The complex character of sensuous perception is learned only by analysis. Associations of ideas may also be so firm and constant that it is forgotten out of what elements they have arisen. Some of the greatest mysteries in the province of psychology owe their origin to such deeply rooted associations of ideas, the beginning and history of which have been forgotten. The theory of *indissoluble association* is the most powerful weapon of the English school against the appeal to *à priori* and original forms of consciousness and ideas. This theory is founded on the just assumption, that that which presents itself to us as a unity and as necessarily coherent, may yet have arisen from the fusing of different elements. It demands therefore a deeper and more extensive psychological analysis than the dogmatising psychology enters into. Such an analysis finds an especial application in associations which have not been formed in the actual consciousness of the individual, but are the bequest of earlier generations, whether by inherited organisation or by tradition and language.

Given a certain idea (a), it may occasion other ideas in two directions. It may either call up ideas similar in kind and content to itself ($a_2\ a_3\ a_4 \ldots$), or ideas, the objects of which usually appear in conjunction with its object (a, b, c, d corresponding to A, B, C, D). The two principal rules are: *the law of similarity and that of external connection* (contact, contiguity). Things related by nature belong together, and things which make their appearance in conjunction belong together for consciousness. It will appear that between the two principal laws there is a transition-form, in which both meet.

I. *Association of Ideas by Similarity.*

(Psychological formula: $a_1 + a_2$).

(1) The first relation to be mentioned under this head is that of sameness (psychological identity) or similarity of congruity.[1] This is the relation which comes into effect in sensuous perception, when the sensation arouses an (implicate) idea and fuses with it. Here lies the starting-point of all the influence which a sensation can

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[1] [In the articles already referred to, Prof. Höffding distinguishes the three degrees of similarity as Deckungsähnlichkeit (similarity of congruity), Qualitätsähnlichkeit (similarity of quality), and Verhältnissähnlichkeit (similarity of relations), and the terms are introduced in the text at his request. For a fuller explanation of them see Arts. 2 and 3 (*Vierteljahrsschrift*, xiv. (1890) 1, 2). (Tr.)]

exercise in consciousness. For whatever states and farther effects it may be able to call up afterwards, the first condition is that there shall be an instinctive recognition, in other words that the sensation shall have a point of attachment in consciousness. This point (a_2) then forms the starting-point of further operations.—There may be recognition, as already mentioned, in the case not only of a sensation which is repeated, but also of a free idea which is repeated. In the first case A and a_2 intermingle, in the latter a and a_2 (denoting as above sensations by capital, and ideas by small, letters).

(2) The next simplest association by similarity consists in recognition leading to the idea of an earlier experience *of the same kind*. When I have recognized a man, the image of him as he was when last I saw him (similarity of quality) naturally comes to my mind. The apple that is on the table in front of me, excites in my idea the picture of the fateful apple on the tree of knowledge (as represented in an old engraving). "A big ball of wool reminds me of my first lesson in physical geography: a ball was made to revolve on a knitting needle, and moved round a stationary object in the middle of the table."[1] The portrait of a person suggests to me the person himself. A step further removed is the idea of people like the one actually seen, *i.e.* of persons who resemble him in feature (as when Lady Macbeth is kept from murdering the old king, because he is like her father), or in character and fate (as when Napoleon reminds me of Alexander and Cæsar, or the Bourbons of the Stuarts).

(3) The examples last quoted lead us naturally to more remote relations of similarity, to *analogies*, parallels, *metaphors*, and allegories, which play a great part especially in the primitive stages of consciousness (similarity of relations). We have already observed, that all expressions for mental phenomena are borrowed from analogous material experiences (see I. 3). There is, according to Max Müller, a period in the development of the race which may be styled the mythological, because "all the thoughts which went beyond the narrow horizon of our everyday life had to be expressed by metaphors, and these metaphors had not yet become what they are to us, mere conventional and traditional expressions, but . . . were felt and understood half in their original half in their modified character." From roots which signify "gleam, glitter," are formed in this way appellations for the sun, the moon, the stars, the human eye, gold, silver, play, joy, happiness, and love. Max Müller

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[1] Example taken from an interesting collection of associations of ideas kindly sent to me.

distinguishes between radical and poetical metaphors. It is a radical metaphor, when a series of words with definite meanings are developed from a root with a somewhat indefinite meaning, each word having its special analogy with the original vague meaning, as when, *e.g.* a root which denotes "to shine" is made use of to form expressions not only for the sun and fire, but also for the spring, the morning light, the clearness of thought, and the hymn of praise. Poetical metaphor arises from a word with a definite meaning being borrowed to denote other objects, as when the rays of the sun are called the hands and fingers of the sun, the rain-clouds cows with full udders, the lightning an arrow or a serpent.[1]—Even at the present day, the poet finds in this way a connection, where the prosaic eye is blind. In the control of rhythm over dancers, he sees, *e.g.* the symbol of the law of the universe, to which the heavenly bodies are obedient. (Schiller: *Der Tanz.*)—In noting down a series of associations of ideas out of my own experience, I have been surprised to find how quickly a metaphorical meaning creeps in, even where the similarity is not quite obvious (*e.g.* with the words swell, mist, gild).

II. *Association of Ideas by the Relation between the Whole and the Parts.*

(Psychological formula: $a_1 + [a_2 + b + c]$).

The transition between association by similarity and association by contiguity is made through those cases where an idea, which has been called up by another idea or sensation by way of similarity, brings with it a group of further ideas with which it is conjoined.[2]—When the sight of the fire (A) arouses the idea of a smithy, the connecting link is the smithy fire (a_2), but the images of the other objects in the smithy ($b + c$) emerge with it.—Mad King Lear tries to comfort the blind Gloucester in his misfortunes; comfort suggests to him a sermon, in which, after the manner of the Puritans, the preacher holds his hat in his hand; from the felt of the hat he is led to think of a possible stratagem of war: to shoe the horses with felt, so as to come upon the enemy noiselessly.[1] He is thus led by subordinate features to construct one scene after another.—In complete derangement (*démence*), where the entire circle of ideas is on the verge of dissolution, association is determined purely by similarity in the sound of the words (*assonance*);[2] similarity of sound may bring with it all the ideas associated with the word. Even in normal states the sound of each word arouses certain associations.[3]

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[1] Max Müller, *Lectures on the Science of Language*, 2nd ed. (1885) ii. pp. 388-390.

[2] Wundt places this relation under the head of association through external connection, (*Physiol. Psychol.*), ii. p. 300 [3rd ed. ii. p. 376]; Sibbern under association by similarity (*Psychologie*, 1856), p. 230; it is with most reason regarded as a transition form.

When ideas of qualities or actions give rise to ideas of things or persons, there is similarly an association between part and whole: a whole group of ideas is constructed through the calling up by similarity of one of the group. When the idea of the cause arouses the idea of the effect, the procedure is the same. We construct the whole connection, of which both cause and effect are members. From the idea of the movements of the planets we are led to the idea of gravity, because we picture the planets as members of the solar system. The like is true of the association between the idea of the end and that of the means.

III. *Association of Ideas by External Connection* (*Contiguity*).

(Psychological formula : $a + b$).

Sensations which always appear together, give rise also to conjoined ideas. It is in this way that the idea of an individual object is formed. Certain visual ideas (yellow colour), ideas of smell, ideas of touch (smoothness), and ideas of taste are associated to form one idea (of an apple). Those things which in respect of space and time appeared together in our experience, will in general be represented together in our thought, even if not formed into a self-contained whole. The idea of a man leads naturally to the idea of his house, his friends, etc., the idea of a gambler to that of a green table, the idea of a wreck to that of a coast, etc. There is, besides, a natural association between an event and the time and place of its occurrence.

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[1] "Thou must be patient; we came crying hither.
Thou know'st, the first time that we smell the air,
We wawl and cry; I will preach to thee . . . mark.
. . . . This is a good block!—
It were a delicate stratagem, to shoe
A troop of horse with felt. I'll put it in proof;
And when I have stolen upon these sons-in-law,
Then, kill, kill, kill, kill, kill, kill."
King Lear, Act IV. Sc. 7.

[2] Griesinger, *Pathol. und Therapie der Psych. Krankheiten*, 2nd ed., p. 374.

[3] Tegnér, *Språkets makt öfver Tanken* ("Speech often Determines Thought"), Stockholm, 1880, p. 25, *seq.*

An important instance of association by external connection is that between the thing and the sign for the thing. An emotion and its external expression are naturally associated in idea. If, *e.g.*, the word "terror" is looked up in a dictionary, the imagination pictures involuntarily the image of a startled movement, of growing pale and so forth. The Greek word for flight (φόβος) acquired later the meaning of fear. Language is a sign of this kind, originating partly as involuntary outburst at the sight of an impressive phenomenon or of one affecting the weal and woe of the individual, partly from involuntary imitation of sounds emitted by phenomena (thunder, splashing, ringing, cries of animals, etc.), but afterwards employed by individuals as a means of mutual understanding. "Just as the subject was himself disposed, in his poverty of ideas and of self-determined forms of expression, to have recourse with the same idea to the same expression (the same sound), so too the sound became familiar to others by being repeated as a response, and by that instinct of imitation which is in operation just at this stage of life and before the sound has as yet acquired a hard and fast meaning; in this way a link common to several persons was at once formed between this sound and the idea in the mind . . . the means of sharing and understanding the idea was formed."[1] Why it should be sound that is the universal sign for all sensations and feelings, may be explained perhaps by the fact that it commands the greatest wealth of shades for the expression of the feelings. Even in the animal kingdom, a cry is at once the involuntary result of anything that makes a strong impression on the individual, and a signal for other individuals. The cry of pain serves as warning, and enticing sounds attract the sexes. According to Darwin, the habit of uttering musical sounds was developed in the progenitors of man during courtship, and was thus associated with the most powerful emotions: ardent love, rivalry, and triumph. This faculty must have arisen, therefore, before the faculty of articulate speech.[2] The several sensations have this in common, that they all, in their different ways, influence feeling; it is consequently not surprising that they are all ultimately translated into the language of feeling.

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[1] Madvig, *Om Sprogets Väsen, Udvikling og Liv* ("On the Nature, Development, and Life of Language"), (*University Program*), Copenhagen, 1842, p. 9, *seq.*

[2] *The Expression of the Emotions*, London, 1872, p. 27 [2nd ed. (1890) p. 92].

(*c*.) It is the first and third of these laws of association that have chiefly attracted attention. And attempts have been made to simplify the matter yet farther by the rejection of one of the two, or by the reduction of both to a single law. For a long time the dominant tendency of English psychologists was to regard the law of contiguity as fundamental, and to explain all union within consciousness by habitual union in space and time. This was the case even with Thomas Hobbes, the founder of English psychology (*Human Nature*, 1640), and later, with *e.g.*, James Mill.[1] This is the principle of the extreme "associationist psychology,"[2] which conceives of consciousness as a series or bundle of sensations and ideas, and can in consequence admit no other associations than such as rest upon external contact. Association by similarity thus becomes only a special case of association by external connection, accounted for by the fact that similar and allied experiences, from the nature of the circumstances, frequently occur simultaneously or in immediate succession. The artificiality of this notion is obvious. It is contrary, moreover, to the experience, that it is often the relation of similarity which causes us to bring together objects remote in time and space. Cæsar, Alexander, and Napoleon, are indeed often presented together in our thought; but this is so just because they have been so often compared with one another. The steps of a mathematical proof easily follow in our memory, but only after thought has united them.

So far from association by similarity being resolvable into association by contiguity, every association by contiguity on the contrary presupposes an association by similarity, or at the least an immediate recognition. In order that *A* may excite the ideas of *B*, *C*, *D*, with which it usually arises simultaneously in consciousness, it must first, so to speak, establish its identity. Thus *A* must give rise to *a*, and only then will *a* bring with it *b*, *c*, and *d*. The relation of similarity is thus the innermost germ of all association of ideas; the external connection can take effect only on presupposition of the internal. When the apple on the table before me carries my thoughts to Adam and Eve, this is because first—perhaps so quickly that I do not remember or am hardly conscious of it—I have thought of the apple on the tree of knowledge. The association by similarity, lying at the root of the association by contiguity, may easily escape our attention. As we may have after-images of sensations which we have not noticed (see III. 6), so a series of ideas may be aroused without our observing that they are linked to an earlier idea through association by similarity. Once, while taking a walk, I was surprised by the vivid memory-image of a Swiss mountain view, and on closer reflection found that it must have been called up by the sight of heavy banks of clouds in the horizon; the resemblance of the clouds to the mountains had—while I was thinking of something quite different—aroused a whole series of associations, which at last drew my full attention. Such an association by similarity may, like recognition, be effected so easily and quickly (especially when what is identified is well known, and has no special interest), that it scarcely rises above the threshold of consciousness. But it is a link which cannot be dispensed with, however much it may vanish into the unconscious.—Here reference may again be made to the fact that the "psychical relation" of a stimulus—*i.e.* its interest for, and connection with, the consciousness of a sleeper—is able to rouse from sleep; this is another case in which we stand at a transition stage between the conscious and the unconscious (see III. 9).

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[1] [*Analysis of the Human Mind*, i. p. 111. (Tr.)]

[2] The expression "association of ideas" was introduced by Locke, who indicated by it, however, only certain individual peculiarities, and did not, like Hobbes and the later school, make the "association of ideas" the one governing psychological principle.

The fact that the relation of similarity lies at the root of association by contiguity, does not deprive this latter of its independent weight. Mere recognition and identification would carry the life of ideas no farther. Through association by contiguity an abundant material is appropriated and preserved in consciousness; the material taken in is then gradually arranged according to the principle of similarity. In every association of ideas two laws are at work: a centrifugal and a centripetal tendency. The two make their appearance in different degrees according to the nature and gifts of the individuals. Some strive to accumulate a large and varied material of ideas and percepts: the aim of others on the contrary is to arrive at as many simple and clear points of view as possible, for which reason they concentrate their interest on the general and typical. Historical research and scientific specialization exemplify the one direction; mathematical and philosophical study the other. Only the artistic genius is in a position to bring into unity the special and the typical.

There is however a psychological point of view, from which the two laws may be brought under one and the same fundamental law.[1]

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[1] Kant, *Kritik der reinen Vernunft*, Kehrbach's, ed. p. 116, *seq.* 125.; Fries, *Neue Kritik*, 1, p. 114, *seq.*; William Hamilton, *Lectures on Metaphysics*, ii. p. 233.

For however many different sensations and ideas may come simultaneously, or in immediate succession, into our consciousness, they neither are nor remain quite separate. They are all embraced by one and the same consciousness, through whose activity they have arisen. The manner in which they act upon one another and are combined, is determined by the form and direction taken by the synthetic activity of consciousness at the given moment. On the other hand, they react, each one of them, upon the general condition of consciousness. Now when one of these sensations or ideas is renewed and brings the others with it, what really operates is the tendency to reawaken the general state, or the general activity, to which all these ideas belonged. The innermost basis of all association of ideas should thus be looked for in the unity which is present in every mental state and every mental activity, and which stamps all simple elements with a common characteristic. From this point of view the association between the parts and the whole would be the typical form of all association. This fundamental law of all association of ideas might be called the *law of totality*.

From this point of view association by similarity and association by contiguity do not figure as two special and mutually exclusive forms, but merge one into the other, since it has been shown above that there is an intermediate form related to both,—a form which now appears as the type of all association. For starting from the formula $a_1 + (a_2 + b + c)$, it may easily be shown that association by similarity and by contiguity are only extreme cases of the law expressed in this formula. Thus when b and c decrease in strength and distinctness until lost in indefiniteness, we are left with the formula of association by similarity: $(a_1 + a_2)$, as the extreme case.—And again in another way, association by totality may be reduced to association by similarity. The more the idea of the common elements (a_1 and a_2) preponderates, the stronger will the differences seem between the other elements (through such effects of contrast as are quoted in pp. 122, 123).[1] The totality is thus divided as it were into two parts (a_2 and $b + c$), and an association is effected with the former only.—But when on the other hand, a_2 is recognized and merged with ever greater rapidity and inattention, we arrive at the formula of association by contiguity ($a + b$).—In our experience it is scarcely possible to point to a case where similarity and contiguity are not both at work. The law of totality is thus properly *the* law of association.

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[1] *Cf.* with the above the interesting observation of Stumpf, *Tonpsychologie*, 1, p. 114.—"The similarity seems to us to be most distinct, when the whole is apprehended as a whole. The more we direct our attention to the resembling parts, the more we lose the impression of the similarity of the whole. I observe the likeness in two faces, inquire into the reason and find that the eyes are alike. So soon as I observe this, the difference of the other features attracts attention, even more than the likeness of that feature, and the likeness of the whole as such seems almost to disappear. In the same way, when two sounds possess the same partial tones, the similarity of the sounds is more evident to me the less I pick out these common tones."

But we must go a step farther. For what lends its special character to every mental state, and at the same time forms the constant common element (a), is chiefly the mood which prevails in it, which determines and is determined by it. As with the immediate sensations, so too in the flow of ideas, the interest, and the attention determined by the interest, play an essential part. We are never wholly passive in associations of ideas, any more than in our sensations (pp. 108–112). The combination among our ideas is consequently in each moment conditioned, not only by relations of similarity and contiguity, but also by the prevailing feeling. We have an approximation to the pure, absolute validity of the above laws, only in instances where the mood is neutral, or rather where it is so concerned in a certain direction as to make it its actual object that the ideas should arrange themselves according to their relation and their connection. To begin with, definite practical ends and interests weigh down the scale in favour of definite sets of ideas. Thus a sort of choice among possible ideas takes place, and here opportunities are afforded to many unconscious influences, which make themselves felt even when we think we are following, and not directing, the current of our thought. From interest we are brought back to impulse, instinct, and temperament, hidden sources which are often only recognized from their effects. The union between feeling and idea lies deeper than that between the ideas themselves. If all mental connections depended on the actual experiences of the individual and on their combination according to the laws of association of ideas, the consciousness of each individual would be much more clear and penetrable than it actually is.—This is not to be understood as implying that mere want of intelligible connection is to be attributed to the influence of feeling. Feeling can on the contrary give rise to firmer connections than there would otherwise be. The strongest feeling is that with which men embrace their ideal or practical aims; this feeling leads to search for the means to realize the aims, and so lays the foundation of a firm connection between a whole set of ideas.[1] This leads us to the consideration of the *real* unity of consciousness (V. *B.* 5) and its importance for the continuance and healthiness of mental life.

The closer investigation into the influence of feeling and will on cognition must, however, be postponed to the following chapters (VI. *F.* and VII. *B.* 2). Here it shall merely be added, that though association by contrast has sometimes been postulated as a special form of association of ideas, the phenomena which come under that head may find a natural explanation through the influence of feeling, in so far as they are not to be explained quite simply by the laws of similarity or of contiguity. It is characteristic of the life of feeling, to move in opposites; from first to last it is determined by the great contrast between pleasure and pain, and we find in it far stronger effects of contrast than among sensations. After great tension in one direction there commonly succeeds a relaxation, if not a tendency to turn the interest in the contrary direction, just as the eye when fatigued with one colour seeks the contrasting colour. This would explain the necessity of passing from the idea of light to that of darkness, and from the idea of great to that of small. But it is not necessary in all cases to revert to the bent that feeling has for contrasting states; the explanation is often contained in a relation of similarity or of contiguity.[2] Contrasts often belong to the same general conception, just as two poles which are removed each in its own direction from a common centre. Dwarf and giant both deviate from the ordinary medium height. And moreover it chances in the natural course of life, that opposites succeed, depend upon and pass into, one another; as day succeeds night; and joy, sorrow. So that here external connection may give rise to the association.

(*d.*) Even if it cannot be admitted that those psychologists are right, who regard obliviscence as the difficulty to be explained, and reminiscence as a matter of course, it cannot on the other hand be maintained that ideas are forgotten "of themselves." It may be as great an art to forget as to remember, whence the reply of Themistocles when Simonides offered to teach him the art of memory, that he would rather learn to forget: "for I remember even that which I do not wish to remember; but cannot forget what I wish to forget." What is indifferent or of little importance disappears as of itself; but the painful ideas are the very ones which, as a rule, are associated with such impressive experiences and circumstances, that the involuntary flow of ideas does not carry them away. Moreover, there may even be in the nature of the individual a tendency to cling with a certain obstinacy to painful ideas. Under other circumstances, the problem may be of course to forget ideas which are associated with pleasure. Here will only be noted briefly the various ways and means by which an idea may be more or less completely expelled from consciousness. These will be the laws of obliviscence as opposed to those of reminiscence.

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[1] Hobbes had already drawn attention to the attaching and arranging power which the thought of an aim exercises in the association of ideas (*Human Nature*, Chap. 4; *Leviathan*, Chap. 3). In later times William Hamilton laid down the law of interest, as supplementary to the law of similarity and contiguity.—(*Cf.* Mansel, *Metaphysics*, Edinburgh, 1875, p. 241, *seq.*). In Wundt's theory of apperception (concentration of consciousness) as act of will (*Physiol. Psychol.* ii. p. 205, *seq.* [3rd ed. ii. p. 235, *seq.*]) the law of interest is ingeniously combined with the notion of apperception as propounded by Leibniz and Kant. Wundt appears to draw too sharp a distinction between association and apperception, between active and passive connection of ideas. No association, whatever it may be, takes place quite passively, just as generally, in every department of mental life, it proves impossible to draw a sharp line between passivity and activity.—In Fries (*Neue Kritik der Vernunft.—Psychische Anthropologie*) are to be found sound and interesting observations on this point.

[2] *Cf.* James Mill, *Analysis of the Phenomena of the Human Mind*, 2nd ed., London, 1869, 1, p. 113, *seq.*

(1) It is not of course possible to oppose an idea quite directly. The art of forgetting (or as it has also been called, of abstracting) can only consist in the suppression of certain ideas by means of others. One who wishes to forget must look for powerful and great series of ideas, in which his thought may be fully occupied. The nature of what he seeks (pleasures or penances, work or fancy) will depend on his character and on the mental resources at his disposal.—The capacity for self-education depends in great measure on the power of exercising the art of obliviscence. Fortunately, as will appear, nature comes to the help of the art.

(2) In many cases an idea is associated from the first with another idea of such strength and importance as gradually to obscure or suppress it. If something is pointed out to a little child with the hand and the hand then taken away, the eyes of the child usually follow the hand instead of being fixed on the object. But if this object attracts the attention for any reason, the child no longer troubles himself as to what has become of the hand. This is the history of all true education (see III. 4); authority leads the pupil to a truth, which ultimately acquires independent validity and weight, and the original authority is forgotten, just as the scaffolding is removed when the house is finished. If the house can be built without the use of scaffolding, of course so much the better. Both the science of education and so-called "mnemonics" have often laid too much stress upon the use of

means which it may afterwards be difficult to drive out of consciousness.

(3) In other cases the first idea does not disappear completely, but becomes a subordinate element in the one it has aroused. In reading, the letters call up a host of ideas and feelings, but for all that the signs themselves do not wholly vanish from consciousness. In metaphorical and symbolical descriptions, the original meaning often remains obscurely in the background. When, for example, the fire of inspiration is spoken of, there is still, to those not much accustomed to rhetoric, a glimmer from the notion of actual fire.

(4) An idea, then, may be suppressed either by an idea quite foreign to it, voluntarily aroused from another region of consciousness ($a < x$), or by an idea which it itself occasions ($a < b$), or it may become a subordinate element in the victorious idea $\binom{b}{a}$. But there remains a fourth possibility. It may preserve its independence as against the other idea to which it is attached, and yet be so closely combined with it that a new idea arises, which is determined by both of the former, although neither is to be distinguished in it. The formula for this would be $ab = c$. Here a sort of psychical chemistry[1] is exhibited: in chemical composition the product has quite different properties from the substances of which it is composed. The history of compound words affords examples. The word "meat-broth" scarcely calls up the two ideas "meat" and "broth" as distinct in consciousness; but it was originally formed to distinguish this kind of broth from any other. —Human speech seems to have passed through three stages of development. At the most primitive, every word is a root and every root a word. This stage, at which every root has preserved its independence, Max Müller calls the *radical;* we have an example of it in ancient Chinese. At the next stage two roots coalesce to form a word; one of the two has then usually the chief weight, and the other becomes a mere ending, for which reason this is usually called the *terminational* stage.[2] Here the two constituents of the word still seem to excite their own independent ideas, even when the original meaning of the termination is lost. On the other hand, at the third stage, which is represented by the Aryan and Semitic languages and called the *inflexional* stage, the roots may be so welded

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[1] Hartley, in his *Observations of Man*, was the first to call attention to this phenomenon. It is a special case of "indissoluble association."

[2] [Max Müller cites the Turanian family of speech, which is however no longer recognized by philologists as a distinct family. (Tr. at author's request.)]

together that only the educated are able to separate them.[1]—The idea of distance seems to us simple and immediate, and yet (as will appear in the next section) it is undoubtedly the product of sensations which no longer take effect independently.—The same holds good of every conception of a totality, which has been reached through the laborious working up of details; the totality stands out as the object of immediate intuition, of an "intuitive knowledge," from which all discursive elements and processes have vanished. Here custom co-operates; the oftener we have gone through the details, the more completely and easily can the totality come instantaneously before us. Successive apprehension precedes simultaneous (*cf.* p. 114, *seq.*).

Such a transformation may be effected more or less mechanically. The expression in words may precede and induce the thought, as in the development of language seems to have been the case in the transition from termination to inflexion. But there may be an intermingling of the actual ideas mainly conditioned by the impulse —grounded in the nature of consciousness—to unity and close combination among the conscious elements.

9. The idea in its simplest form is a reproduced sensation. As such it is uncompounded, in the sense in which a sensation is uncompounded (pp. 102–106), and may be called *simple idea.* Out of such simple ideas are formed, through association by contiguity (V. B. 8 *b.* III), complex ideas, which correspond to the complex percepts; they concern objects, persons, relations and events, and may be called *individual ideas.* In these, the simple sensations are united into ideas of individual totalities. The connection between the simple ideas, of which the individual idea is composed, may be so firm and close, that we are disposed to regard this latter as corresponding to a certain mystical unity in the objective world, namely, to what we call the "thing itself" as distinct from its qualities.

These individual ideas are, however, by no means firm and invariable. Their elements may change, and often they are in one moment something different from what they were in the preceding. My idea of the table, at which I am seated, is formed by a combination of various simple ideas (a certain colour, and certain degree of hardness, form, position, etc.). But every single time that I have seen the table, I have seen it in a different way: point of view, light, position have not been exactly the same on any two occasions; now the one, now the other element (now colour and hardness, now form and position) has, from the special circumstances, attracted my attention. If, however, I say I have an idea of the table, and if I recognize the table by means of it, it seems that my idea, if it is to apply to every experience I have had of the table, can contain only certain general points or features, which recur every time that the table is before me. We can have a really individual image of an object or of a circumstance, only if we have experienced it merely one single time. If there have been more experiences, the differences will make themselves more or less felt; we picture our home, *e.g.* now in one, now in another setting, and a certain conflict may arise among the elements as to which shall have the decisive influence upon the character of the idea, and this so much the more, the richer and more varied our experiences.

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[1] M. Müller, *Lectures on Language*, 1, pp. 331, 336, 370.

As it is not in our power to retain one and the same memory-image for any length of time (for which reason also, what we call dwelling upon an idea is in reality a constant letting go and reproducing of the image), so the same individual idea has a tendency, every time that it re-emerges, to change of form. The elements preponderating in the one moment will, by force of the law of contrast, give place to others which have greater freshness. The question is then, Have we really ideas of individual objects and circumstances, which are more than mere repetitions of the several experiences and percepts? Have we general or typical ideas, which apply to all the single percepts experienced by us?

The difficulty of the question consists in this, that every complete representation of an object must give it to us with all its traits and qualities. Our ideas always tend to become complete and individual, and so much the more, the more vivid they are and the more the attention is directed to them. Since, however, the individual traits and qualities vary with each experience—for an absolute repetition never occurs, but there are always differences in degrees and surroundings—I have consequently not one individual idea of an object, but many. We may therefore distinguish between a concrete individual idea (of the table in this light, from this side and so forth), and a typical individual idea (of this table as opposed to other tables). Now in what sense do we have typical individual ideas?

The psychological difficulty involved was faced long ago. It was not, however, the individual, but the *general* ideas which drew attention to the difficulty. It was not observed that our ideas of single objects and circumstances, which have been presented more than once in our experience, are abstract ideas quite as much as general ideas proper. My idea of a table in general bears the same relation to the different tables which I have seen, as my idea of this particular table to my different experiences of this table. The general idea arises out of a continuation of the same process, by which the typical individual idea is formed. As the concrete individual ideas struggle for the decisive control of the typical individual idea, so the different individual ideas struggle for the decisive control of the general idea. When I try to picture to myself a triangle, I think now of an isosceles, now of an equilateral triangle and so forth. The common features do not suffice to constitute an actual image. Just as we cannot eat fruit in the abstract, but eat only apples or pears, etc., so we cannot picture fruit in the abstract. But, then, have we, psychologically, really general ideas?

Berkeley first called attention forcibly to this psychological difficulty (in the introduction to his *Principles of Human Knowledge*). The ordinary theory of abstraction postulates, without more ado, a capacity of "drawing out" general qualities and laws, and of forming, out of these, new "abstract" ideas. Berkeley denied altogether that he had such ideas, although by other philosophers, such as Locke, *e.g.*, the power of forming them was given as one of the chief features which distinguished men from animals. "It is impossible for me," says Berkeley, "to form the abstract idea of motion distinct from the body moving, and which is neither swift nor slow, curvilinear nor rectilinear; and the like may be said of all other abstract general ideas whatsoever." Every idea has reference to something quite individual and particular. There are typical or general ideas, only in the sense that we can make a concrete individual idea serve as an example or representative of a whole series of individual ideas. The generality of an idea will, then, mean nothing more than its fitness to be employed as example or representative.

Berkeley has here undoubtedly laid his finger on the crucial point. But it still remains to be asked, What is the psychological process by which an idea comes thus to be set up as representative?

In the formation of the idea of a particular object (the concrete individual idea) the law of contiguity operates; in the formation of the typical individual idea and of the general idea, the law of similarity. The several experiences and the several individuals have in common certain universal elements, which come into contrast with the elements peculiar to each experience, to each individual. Supposing $A = ax$, $B = bx$, $C = cx$, to be three experiences, then, according to the law of similarity, the special idea x will be something more in consciousness than a, b, and c. The light of recognition will fall on it more clearly, x will form a clear and constant nucleus round which a, b, and c will move as obscurer, looser elements. The error of the old abstraction theory lay in supposing that x could be detached and represented in isolation. x (one or more special properties) is not enough to give us an individual idea, but must be represented in conjunction with a, or with b, or with c; which of these possibilities makes its appearance, will depend on the special circumstances.

It might seem as though the simplest psychological explanation of this matter were that which makes the interaction of the ideas themselves the determining force. Repetition, from the nature of the case, brings x much more frequently than a, b, or c, and x acquires in consequence greater strength and constancy, while a, b, and c, on the contrary, check and obscure one another. The common elements keep above the threshold of consciousness, while the struggle of the other elements takes place at the threshold. In this way the individual traits would be worn away and only the general retained. This account would bring us back, however, to the old abstraction theory. The process must end in only the common elements being left, and this is contrary to the individual character of all distinct ideas. Let us think, *e.g.*, of the horse, the sheep, and other ungulata. The common property (x) is given in the definition of ungulata; "mammalia having the incisors and canines often absent in one or both jaws,—molars all similar, when present,—toes large, covered with hoofs." In attempting to form an idea answering to this definition, we have first to make a choice as to the number of incisors and canines absent and in which jaw or whether in both, the presence or absence of molars, and the nature of the hoof, and then to supplement the properties given with others, belonging either to the horse, the sheep, or some other special kind of ungulata.[1]

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[1] [The definition of ungulata is substituted for that of pachydermata at Prof. Höffding's request, the latter being no longer recognized as a special order. (Tr.)]

The individual ideas might be thought of as merged into a *generic idea* (ax, bx, and cx, yielding px), as it is possible to have generic photographs of members of the same family or class.[1] But even if it were possible to have such "cumulative ideas," they would have to be limited to cases where the differences are not too great. The merging of related ideas is therefore at any rate confined within narrow limits.

The theory of generic ideas, as well as the old abstraction theory, presupposes that the reciprocal interaction of ideas is the determining force in the formation of typical and general ideas. But it has already been shown (V. *B.*, 8 *c*), that we cannot carry through the doctrine of the association of ideas, without taking into consideration the other sides of mental life.

We are indeed often so passive, that the involuntary play of ideas seems entirely to prevail. Many dim, vague, and casual general ideas are undoubtedly formed by purely mechanical fusion. But for the most part we have a personal interest in the course which the ideas take. We have a definite practical end, and seek the means to it, or a definite theoretical problem, and seek its solution. Our attention is consequently concentrated round the elements which point in the desired direction, and will address itself to the other elements no more than is necessary to apprehend the ideational image. And concentration will bring to the fore those particular elements, as attention in general brings to the fore our sensations and memories. This will be not least the case where the points of similarity are held fast in spite of strong differences. a, b, and c all try to divert the attention to themselves, and it is only when the end and the motive determining the movement of thought are sufficiently strong, that the interfering associations of ideas are kept at a distance. In the idea ax, we thus note principally the x. We may demonstrate the general properties of the triangle by means of any triangle we like, because we can avoid taking into account the special properties of the triangle described (whether it is right or obtuse-angled, etc.). General and typical ideas exist therefore in the sense that we are able to concentrate the attention on certain elements of the individual idea, so that a weaker light falls on the other elements.

It would, however, be an error (an error in which Berkeley partially involved himself in his zealous and important dispute with the ancient theory of abstraction), were it to be supposed that we begin with special ideas, then form concrete individual ideas, afterwards typical individual and finally general ideas. It is in fact a great art, and presupposes much practice, to know how to apprehend the concrete and individual, and mental development must be measured no less by its progress in this respect than by the power of concentrating the attention on the typical and general. Distinctness and individuality are relative conceptions, and our ideas may in this respect pass through a whole scale. The ideas of children and of primitive men have often a certain abstract, vague, and general character, because they do not distinctly apprehend and hold fast the individual shades and differences. At the first, only particular sides of the object are apprehended and preserved; it is connected with this, that the primitive consciousness, which in its sanguine nature has a tendency to attribute reality to all its ideas, suffers so many disappointments, since it argues from agreement in one particular to complete identity (V. *B.* 4). A child, *e.g.*, calls every man father. Many of the happy hits and good sayings of children are connected with the abstract and one-sided character of their ideas. In primitive zoology the walrus is classed with fish, the bat with birds. The Indian calls iron "black stone," and copper "red stone." The Bushman calls the carriage of the European traveller "the big animal of the white man." Our provisional ideas of a thing in like manner have, as a rule, a vague character, are given only in the most general outlines. In this connection have been cited with justice the ideas we have of things or circumstances about which we are asking or which we are trying to find, and in particular the ideas that express tendencies, the general bent of which is determined, but not the special form of the thing aimed at.[1] In agreement with this is a fact noted by Leibniz, that primitive roots in language have an indefinite and general meaning, which is only gradually rendered precise and special.[2]

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[1] Galton, *Inquiries into Human Faculty*, p. 349, *seq.* (*cf.* 12, *seq.* 183, *seq.*).

The strong and simple confidence in ideas once formed leads, however, to an over-rating of the differences as well as of the resemblances. A child, who had learned his letters, saw a book with Greek characters on the one side, Latin on the other. Thereupon he exclaimed: "This is Greek, but these are letters."[3] He could not enlarge his general idea of letters. Similarly, many nations have regarded their own as the only real language; the language of foreign nations appeared to them as murmuring or stammering, as the lisping of children, or the cries of animals. Barbarians, the Greek word for all who were not Hellenic, signified really persons who speak harshly and inarticulately. Corresponding words and ideas are to be found among the ancient Indians, Hebrews, and Arabians; indeed even the people of the Herero (a Kaffir race in South Africa) consider that they alone speak, and all other nations stammer. It was only on closer acquaintance with the "barbarians" that the Greeks discovered, that (to quote Strabo's expression) the difference turned "not on a defect in the organ of speech, but on peculiarities in the language."[1] And similarly with the conception of "the State," which the Greeks would not apply to the associations of the barbarians.—The Greeks were more liberal in recognizing the divinities of other nations; yet the first Christians were styled atheists (*ἄθεοι*), and in later times those whose conception of God has differed from the ordinary conception have often been stigmatized with the same name.—How many struggles with limited general ideas did it not cost, before it began to be recognized that the earth is a planet and the sun a fixed star!—The development of the life of ideation consists, then, as much in generalization as in specialization, and in both respects great resistance may have to be overcome.

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[1] W. James in *Mind*, January 1884, p. 15.

[2] Leibniz, *Opera Philosophica*, Erdmann's edition, p. 297. Max Müller, *Lectures on the Science of Language* (2nd ed.) i. pp. 425-445.

[3] Egger, *Observations et Réflexions sur le Développement de l'Intelligence et du Langage chez les Enfants*, Paris, 1879, p. 22.

10. General ideas cannot be formed and retained in consciousness without the help of language. To the association by similarity of the homogeneous elements in percepts and ideas must be added, then, the association by contiguity between the idea and its symbol (8, *b.* III.).

Even if language is from the first essentially a medium for the communication of formed ideas, and not for their formation and retention, and even if the combination of ideas may advance to a certain degree without the aid of language, there yet arrives a point in mental development where language is necessary to any further advance.

In proof of the independence of the ideational processes, appeal might be made to the facts,—that children have ideas and think before they learn to speak,—that the power of speech is lost in certain pathological states without the reason being in any way impaired,—and finally, that in certain languages expressions are wanting for ideas, which cannot themselves be unknown to the nations using those languages.

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[1] L. Geiger, *Ursprung und Entwickelung der menschlichen Sprache und Vernunft* ("Origin and Development of Human Speech and Reason"), 1, p. 300, *seq.*

But even if no speech can be ascribed to a young child, there is at any rate no lack of signs and tokens which may serve as a means of retaining the ideas, being associated with them by contiguity. At this stage, instinct and feeling have the upper hand. These obtain a vent in involuntary expressions, which become, as soon as the child is able to notice them, a sort of mark by which the percept or idea causing the feeling receives an impress distinguishing it from others. Thus the very first formation of ideas is not wholly without extraneous support, even though it is not the word which affords it. The child begins life with a cry, but does not himself hear this cry. It is not long, however, before he begins to find a great satisfaction in the sounds made by himself. Out of these sounds, brought forth involuntarily, the child forms his first speech. Even at the age of six months he can often give answer in this language when he is spoken to. Afterwards there comes a period when this instinctive speech is used and modified with more freedom, so that an imitation of the speech he hears around him is attempted.[1] At this intermediate stage the speech of each child is quite individual. It is only at the third stage that language, as historically developed, obtains a hold on the child, and then the combinations of ideas also become easier and livelier.

It is no wonder that men are able to dispense with speech, after having availed themselves of it for a whole lifetime. The ideas have then naturally become strong enough to be able to endure, for at least a time, without the help of the symbol. Besides, they have gestures and actions, by which the ideas may be held fast. A striking example of the fact that ideas, when once formed, are independent of words, is afforded in a woman of seventy years of age, whom Kussmaul mentions.[2] In consequence of an apoplectic seizure, she had lost the power of speaking and writing, and could give vent to sounds only when she was affected by violent emotion. She could read, however, and displayed great energy and intelligence in the recovery of her right to manage her property, which had been taken from her under the mistaken idea that she was weak in mind.

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[1] I base this account on the store of words possessed by a two-year-old child.—*Cf.* also the work cited of Egger's, p. 20; Preyer, *Die Seele des Kindes*, p. 259, *seq.* (Eng. trans. ii. p. 99, *seq.*)

[2] *Die Störungen der Sprache*, p. 22.

When a language lacks expressions for an idea, which is yet probably possessed by the people—as *e.g.* in the case of the Samoyedes, who, according to Castren, have no term for gratitude—this may be explained in several ways. It may be that the feeling exists as an instinctive, involuntary emotion, which has not become an object of consciousness; it is characteristic of savage races, that in their friendly as in their egotistic feelings they are children of the moment. Castren adds that a Samoyede will risk death for any one who has made him a present. Or the explanation might be that the Samoyedes do not have quite the same general idea as we have formed, the elements of what we called gratitude being perhaps included in the expression for a related virtue. Thus we, for example, have no one word to express the Latin "pietas."[1]

The primitive cognitive functions, sensation and perception, do not require the definite symbols of language. The memory-image, if not perfectly fresh and vivid, may, however, be in need of the name. The more the memory and the idea renew the reality for us and approximate to intuition, the more they are independent of the word (see 7, *a* and *b*). But with more faded and especially with typical and general ideas, the word is an essential help. With some people thought is an inner speech to the extent that intense thought makes them hoarse. For this reason thought has been called "a process of speech imperceptibly carried on in the central parts," which stands in the same relation to actual speaking as the will to actual movement.[2] This is especially the case with persons whose ideas of words consist mainly of motor-representations.[3] With other persons ideas of words are mainly auditory or visual ideas, *i.e.* they are reproductions of words as seen or heard.[4] Still there seems to be with everybody an innervation, more or less strong, of the articulatory muscles in every representation of a word.[5]

In the general idea the word is of especial importance. For here there is no longer anything which can be intuited, and even the need for something to intuit introduces a danger, for it may lead to the confounding of the typical with the individual. Only by means

[1] Tegnér, *Sprakets makt öfver Tanken*, pp. 100-101.—Thus the natives of Hawaii appear to have only one word for love, friendship, gratitude, kindness, and respect; they denote all these feelings by the word *aloha*. Max Müller *Lectures* (2nd ed.) ii. p. 343.

[2] L. Geiger in the work cited, 1, p. 58.

[3] Stricker, *Studien über die Sprachvorstellungen* ("Studies on the Ideas of Speech"), Vienna, 1880, p. 20, 32.

[4] *Cf.* my treatise "Ueber Wiederkennen, Association und psychische Activität (*Vierteljahrsschrift f. Wissenschaftl. Philosophie*, vol. xiv. (1890), p. 178).

[5] [The text has been changed at Prof. Höffding's request. (Tr.)]

of the name can the clear and firm nucleus escape confusion with its obscure and changing surroundings. The name is, as it were, a substitute for the impossible intuition, and by misuse it may even take the place of the general idea.

The deaf and dumb, even if they have not learnt to talk on their fingers, describe objects and experiences in the liveliest and most individual way by gestures and imitative movements. But this very individuality and concreteness of their expressions makes it impossible for them to form clear and definite general ideas; these do not get properly disjoined from individual ideas. Thus they indicate meat and food by pointing to their own body, red by touching the lips. They can express the special way in which a thing is made (a wall built, a dress cut out, etc.), but not the general idea of making. This is why the want of hearing and speech so greatly interferes with mental development.[1]

11. The definite limitation of the idea, which is rendered possible by the concentration of attention, assisted by the symbol of the name, makes possible in its turn the transition from idea to *concept*, and from mere association of ideas to *thought proper*.

Thought proper is not absolutely opposed to the involuntary flow of ideas (any more than to sensuous perception, see V. *A*. 5 and *B*. 3). From two sides relationship is apparent. In thought proper is exercised, only in a more regulated manner and according to certain definite principles, the same activity that manifests itself in all sensation, sensuous perception and association of ideas: the comparing activity, which we have described in its elementary, its implicate, and its free form. And this application of the comparing activity *according to definite principles* is possible only because there is a definite *interest* in combining ideas in a way that can stand the test of experience. This interest leads to the search for a certain standard, by which every combination of ideas may be tested. This presupposes a critical moment, a special awakening of the attention and of the interest. And such a critical moment, again, presupposes that so abundant a material is involuntarily found and provisionally arranged, that consciousness acquires a freer attitude towards its elements. The simple, primitive consciousness feels no need to form concepts, but goes passively from disappointment to disappointment (V. *A*. 4). Thought proper presupposes a power of abstracting from the immediate present, and of taking into account more distant elements and relations. There must thus be exercised on the one hand a self-control to keep down the elements which spring up involuntarily, when they are not to the point, and on the other hand a positive striving to call up and collect everything which bears on the matter in hand.

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[1] Tylor, *Anthropology*, London, 1881, p. 119. Oehlwein, *Die Natürliche Zeichensprache der Taubstummen und ihre Psychische Bedeutung* ("The Natural Language of Signs of the Deaf and Dumb, and its Psychical Significance"), Weimar, 1867, (quoted in Preyer, *Die Seele des Kindes*, p. 406). (Eng. trans. ii. p. 22, *seq.*)

Thought is to this extent an affair of the will. But the will cannot create something out of nothing; it can only form and change what is involuntarily given. Logical thought has essentially a critical character; it examines, weighs and estimates the relation of similarity, which is always the final condition of the association of ideas, but a condition about which the involuntary activity of consciousness is not so particular. Thought does not, however, merely examine the given associations of ideas; it always endeavours to put in their place new associations, more in harmony with experience. It holds fast by its standard, and continues to reject until a combination of ideas arrives which satisfies it. This selection rests, like all selection, upon an association by similarity or a comparison: that is selected, which most closely and completely answers to the requisitions of the standard.

Thought proper has at its command no means and no forms, which have not been already employed in the involuntary flow of ideas. The difference is one of degree only, depends on the closeness with which the relation of similarity is apprehended. The circumstance that the association of ideas becomes the object of express interest and conscious choice, cannot alter the laws of association. Thought proper can no more be emancipated from these laws, than any artificial machine can arrest the laws of external nature. But we can employ psychological laws in the service of our aims, just as the physical laws.

That thought proper is an affair of the will, must not be taken to mean that the act of thought is always executed with full consciousness. Thought, if free and energetic, takes its course with such haste that we forget ourselves. When we really reflect, "we are sunk into thought," are overpowered by it. But the will is not quite the same thing as self-reflection and self-constraint. We may very well wholly forget ourselves, and yet guard against casual and unwarranted combinations of ideas, may avoid falling into inconsequence and error. Practice takes effect in thought as in every other activity. Before practice is acquired, opposition may often have to be overcome, and in the effort necessary, the part played by the will is clearly apparent: the principle to be applied, the standard to be observed, must be kept hold of as the guiding thought (centre of association). When the practised thinker gives himself up to the course of his thoughts, there is not less concentration of attention, but the agency of the will is more hidden, because its energy is now at one with the energy of the flow of ideas. Only if difficulties and opposition appear, will it again become distinct.

It is the business of logic, not of psychology, to set up a standard for combination of ideas, and to indicate the rules which such a standard affords for the association of ideas in harmony with experience. Logic is an artificial, psychology a natural science. But art grows out of nature and is a continuation of it. And it is also of interest psychologically to see that the standard for valid combinations of ideas is no other than an ideal expression of that which enters more or less distinctly into all involuntary association of ideas. Logic judges all associations of ideas according to the degree in which they satisfy the principle of identity, *i.e.*, in which they fulfil the condition, that each idea, wherever and whenever it occurs, must have the same content ($A = A$). This principle corresponds to that recognition which is the presupposition of all association (V. *B.* 8 *c.*). In the logic of concept, judgment and inference, is manifested the importance of this principle.[1]

The first condition of thought proper is that the ideas (simple, individual, or general) dealt with, shall be severally held fast and made precise. In the involuntary flow of ideas, the ideas have a vague character, and pass easily one into the other. By definite limitation (definition, determination of the concept), the content of the several ideas is established, and the ideas are thus converted into concepts.

In judgment two or more concepts are combined, the one being shown to be a closer determination of the other, to present a part, a side, or an effect of what is contained in the other. At the root of the judgment is the percept or the idea of a connected whole which the judgment analyses. I make the judgment "the man is good," when I see or conceive that the man acts in a certain way; and in my judgment I bring to the fore that definite side from which the man appears to me on this occasion. If I pass from the subject of the judgment to the predicate, and transfer my attention from the idea of the man to the idea of goodness, I still do not let go the subject, the idea of the man; for supposing that I *had* let it go, by the time I reached the predicate (of goodness) the combination of the two concepts would not have taken place. The judgment is a closer determination or analysis of the subject-concept, and the predicate-concept is thought only in its connection with the subject-concept. The mental operation, undertaken in judgment, is thus a dividing into parts, a special calling out of those elements which to the immediate apprehension were given in unresolved unity.—In the development of language there is a stage at which concept and judgment are not expressed in different forms. Root-words expressed originally events, actions or circumstances, they were "propositions in embryo." The word then signified indifferently, the subject of the action, the action itself and the object of the action.[1] The need for a distinct term for each several part of the main idea could arise only after the attention had been directed to them separately. The earliest words of children are similarly "propositions in embryo." Bow-wow denotes "the dog," "there is a dog!" as well as "the dog barks." Preyer describes as follows, how his child (at the age of twenty-three months) pronounced one of his first judgments:—"The child drank some milk which was too hot for him, quickly put the cup down, and said loudly and distinctly, gazing at me earnestly with eyes wide open, 'Hot!' This one word was meant to signify 'the drink was too hot.'—The cry 'tool' may mean either: (1) Where is my stool; (2) My stool is broken; (3) I want to be lifted on to the stool; (4) Here is a stool."[2]—When I am about to make a proposition, at first only the main thought is clearly present; the formulation of the proposition takes place by differentiation of the subject- and predicate-concepts from the unity of the main thought. A speaker absorbed in his subject may never perhaps undertake the full analysis of his main thought; the half involuntary mechanism of speech provides, however, for its presentation in detail, without any express act of consciousness being required.[3] The attention and the energy of the speaker would be far too much dissipated if he had to divide them between the main thought and its presentation in particular judgments. These facts seem to confirm the view of the judgment as an analysis.

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[1] *Cf.* my *Treatise on Formal Logic*, Copenhagen, 1884.

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[1] L. Geiger, *Ursprung und Entwickelung der menschlichen Sprache und Vernunft*, 1, p. 205.

[2] Preyer, *Die Seele des Kindes*, p. 279, 310. [Eng. trans. ii. pp. 144, 154.]

[3] *Cf.* Kussmaul, *Die Störungen der Sprache*, p. 196.

The determination of concepts and the formulation of judgments are for logic only preliminaries to the inference. The inference is the clearest form of thought proper. By its means a judgment is proved; *i.e.* deduced from one or more other judgments. Inference comes in, when doubt has been cast on the validity of a judgment, and it cannot be established by immediate reference to the percept. The assertion A is not $= C$, must be withdrawn if $A = B$ and $B = C$. The demonstrative force of the inference is based upon the principle of identity; for if *e.g.* $B = B$ does not hold good, an inference is impossible. Unless the principle of identity is presupposed, thought can make no progress. This principle is therefore the highest law of thought, the postulate on which all science depends. It is, however, no arbitrary or accidental postulate; the relation of similarity underlying all association of ideas is expressed by the principle of identity in an ideal and absolute form, to which our actual associations attain at best only approximately. Psychologically the strict principle of identity can be realized only to a certain extent; in reality there is, as frequently noted, no absolute repetition. The principle of identity is a logical abstraction. But still there is here a point at which logic and psychology so far approach one another, that the growth of logical thought becomes psychologically intelligible.

If, on the contrary, the relation of similarity is not admitted as the presupposition of all association, the origin of logic is incomprehensible, and the principle of identity is given as an absolutely arbitrary principle. For whence should thought derive its standard, its principle, if this is not the idealized expression for the true nature of thought, and to be found consequently in imperfect and vague forms at all stages of intellectual life?

John Stuart Mill, in his celebrated *Logic*, went a step farther, and tried to carry out a theory of inference not based upon the principle of identity. According to him the original inference is from particular to particular; when a child has burnt itself, it cries at the sight of the fire, because it expects the pain to follow; it thus argues from one particular phenomenon (the fire) to a different one (the pain). This inference can be based only on habit or instinct.—Mill overlooks, however, that there is a definite condition, without which the child's inference would not be possible. If the fire is not, as before, alight, then the child is mistaken. But if it is as before, he will get burned if he touches it. The principle of identity is thus involved, if the inference is correct. The primitive consciousness gives itself, however, on account of its sanguine tendency, no time for confirming or weighing resemblances (*cf.* V. *B.* 4). Only after repeated disappointments does it learn "to be careful," *i.e.* to try how far the identity goes. It is through such experiences that the transition from the involuntary flow of ideas to thought proper is effected. To the involuntary flow of ideas any resemblance, any contact, suffices to establish a combination of ideas. Mythologies, dreams, the fancies of children, the delirium of the mentally deranged, and the changes in meaning of one and the same word, all seem to show that no combination of ideas is impossible. Thought proper reviews and tests the resemblances and tries to build up a structure of thought, in which by force of the principle of identity each several member is combined with the others.

12. While a development from the concrete individual, through the typical individual, to the general, idea, leads us from the mere association of ideas to thought proper, another process of development may take place, which does not lead away from the concrete individual ideas, but rather results in the formation of new ones. The *creative power or imagination* (in the narrower sense) [1] grows out of the same root as thought, but in a different direction.

In order to understand this process of development, it must be borne in mind that even the concrete individual idea is complex in nature, a product of association (V. *B.* 9). Hence the possibility that the same elements may be linked in other ways, presented in other combinations. By the exchange of even some of its elements for others the individual idea may acquire another appearance. This happens more or less with all our memories. Special features get wiped out, and their place is taken by others without our noticing it. In the very cases where we keep secure hold of the essential features, this kind of transposition and shifting may take place in the subordinate features without attracting our attention, when we have no opportunity of comparing the memory-image with the percept. Dreams, whether dreams proper or waking dreams, go still further and transform the dominant and determining elements of the individual idea, thus creating ideas of individual persons, things and events, which have never been presented in experience. We may dream of persons, as standing clearly and vividly before our eyes, whom we have never seen.

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[1] Imagination in the wider sense is identical with the power of ideation: this was the original meaning of the Greek word φαντασία. If we keep to this, then the whole doctrine of memory and of ideation is a doctrine of the imagination.—In the narrower sense, imagination is the power of forming new concrete ideas, and this is the sense in which we now employ the word.

We employ this power of free combination[1] daily when we try to get at the gist of something of which we do not know the full and complete facts. When we understand an allusion, we enlarge the given scattered elements into an individual totality. The inventor of a new mechanism combines given elements, the laws of whose activity he knows, into a totality and a connection which has no complete parallel in experience. The scientific discoverer in like manner looks round among his elements of experiences, tries their possible combinations in order to find the one which accords best with other experiences. During this process there is formed in his consciousness a succession of individual ideas, which are rejected one after another, until that one appears which best grasps and fits in the given elements. What is marvellous in scientific genius is the mental freedom with which it is able to abstract from experience, and to picture the different possibilities with all their consequences, in order to find by this means a new reality, not accessible to direct experience. Kepler cited this mental freedom as a significant feature in the genius of Copernicus.[2]

The freedom in respect of what is given, which scientific imagination presupposes, appears not only in the new combinations, but also in the power of discovering agreements, of finding the same fundamental relations, in the midst of very changed or complicated conditions. Such more deeply penetrating apprehension of similarity lies at the bottom of the association by contiguity at work in the combination; starting from the single recognized or identified characteristic, a whole new connection (according to the law of totality) is constructed, as when Newton, according to the story, obtained from a falling apple the idea of the fundamental law of the planetary system. Free combination leaves the differences as they are, but brings the manifold elements into a new harmony. When, however, it works in the service of scientific inquiry, it always requires, as a corrective, thought proper with its power of weighing similarity and difference. The formal or abstract sciences (logic and mathematics) form therefore the basis and the corrective of the real

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[1] This power is scarcely to be found at the lowest stage of human existence. The imagination of savages is reproductive, not constructive. Spencer, *Princ. of Sociol.*, pp. 39 and 47.

[2] "Copernicus vir maximo ingenio et, quod in hoc exercitio magni momenti est, animo libero." (Reuschle, *Kepler und die Astronomie*, Frankfurt, 1871, p. 119.)